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SPECIAL REPORT
OF
A RECONNOISSANCE OF THE ROUTE
FOR THE
NORTHERN
PACIFIC RAILROAD
BETWEEN
LAKE SUPERIOR AND PUGET SOUND,
VIA THE COLUMBIA RIVER,
Made in 1859,
By W. MILNOR ROBERTS, U. S. CIVIL ENGINEER,
UNDER THE DIRECTION OF
MESSRS. JAY COOKE & Co.
BANKERS.

ORGANIZATION.

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J. EDGAR THOMSON.

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Financial Agents for the Railroad Company:

JAY COOKE & CO.

PHILADELPHIA.

Philadelphia, June 1, 1869.

W. MILNOR ROBERTS, Esq.

AND OTHERS:

GENTLEMEN:—The Directors of the Northern Pacific Railroad, having proffered us the Financial Agency of their Company, we feel it our duty before accepting the trust, and before we institute measures for the sale of the Securities of the Company, or become identified with this great work, to cause a thorough examination of the route to be made, by agents chosen and sent out by ourselves; and we do this, not because we do not place implicit confidence in the representations made to us, or doubt in the least the numerous and very able explorations already made in detail by men of the highest scientific and personal character, but because of our long established rule to make "assurance double sure," and to take every precaution to avoid placing in jeopardy, not only our own means, but the means of those who confide in our judgment.

We request you and the gentlemen detailed as your companions, to proceed to the Pacific coast and, after a thorough examination of Puget Sound and the Columbia river—the two termini of the Northern Pacific Road—to proceed eastward along the general line of the road, via Columbia river or the Snoqualme Pass, by such route as you shall select to the passes in the Rocky Mountains, and thence to Fort Benton, and also to the waters of the Yellow Stone.

Other parties, under Governor Smith, of Vermont, and Governor Marshall, of Minnesota, will explore the already well known route from Lake Superior to Red river, and up the valley of the Cheyenne to the great Bend of the Missouri. General Hancock, the military commander of the Northwest, now about returning from an extensive tour along the Missouri and the Yellow Stone, will furnish the information we need as to this remaining link.

As soon as possible after your return we desire a full Report from you of the whole route, based upon the explorations of these parties, as well as the information given at an earlier day by the distinguished explorers who have gone before you, and which we doubt not will now be fully verified.

Sincerely your friends,

JAY COOKE & CO.

To

Messrs. JAY COOKE & CO.

BANKERS,

PHILADELPHIA.

September 25th, 1869.

GENTLEMEN:—Pursuant to your instructions, dated June 1st, 1869, I proceeded, without delay, by railroad to Omaha, and there met the gentlemen, five in number, with whom I was to be associated in the important investigation committed to us. We proceeded by the Union Pacific and Central Pacific Railroads, 1,775 miles to Sacramento, and thence 120 miles by the Sacramento river and across the bay to San Francisco. At San Francisco, on ascertaining that the steamer for Portland, Oregon, would not sail for several days, we decided on taking the overland route back through Sacramento, and thence along nearly parallel with the Pacific coast to Portland, on the Willamette river, an important tributary of the Columbia. Railroads are already in the course of construction, extending northward from Sacramento, and we rode over the finished portion, extending 70 miles beyond Sacramento, to Oroville; thence in stages 560 miles to Portland, passing through a number of towns and cultivated lands in Northern California, and through Salem and other towns in Southern Oregon. Although this coast route is partially broken by some mountain ranges, there are extensive areas of fine agricultural country, which, on the completion of the railroads now in progress, will contribute their share of passenger travel and general traffic to the main trunk roads with which they connect. At the northern end of our journey, especially on the last hundred miles of the Willamette valley, approaching Portland, we were particularly struck with its beautiful appearance

as an agricultural region, already settled and cultivated far beyond our anticipations. Two railroads, one on each side of this great valley, are now in process of construction, and the people of that region, with good reason, are confident that there will be business enough for both as rapidly as they can be extended. This splendid valley, with the aid of these railroads, will concentrate a large railroad trade at Portland, one of the western termini of the North Pacific Road, which must tend to augment the business and population of that flourishing city, and thus furnish a valuable contribution to the business of the Northern Pacific Railroad. The enterprising men of Portland, who, upon the occasion of our visit, gave us a hearty reception, and expressed the most lively interest in the success of the Northern Pacific Railroad, have, in the space of a few years, built an elegant city, with all the modern appliances of water supply, gas, Nicholson pavements, handsome churches, stores, etc., as well as commodious wharves, at which we saw numbers of sea-going vessels from foreign ports, and river and ocean steamers. Vessels drawing fourteen feet water can enter and depart at all times, and sometimes vessels of greater draft arrive. The population is already over eight thousand. One circumstance in connection with the enterprise and business capacity of Portland is worthy of special notice. The Oregon Steam Navigation Company, originated here by a few gentlemen less than ten years ago, with a capital of about one hundred and fifty thousand dollars, now owns twenty steamers running on the Willamette river, up and down the Columbia river from Portland, on Puget Sound, on two different stretches of the Columbia above the Cascades, on Lake Pend d'Oreille, and on two different portions of Clarke's Fork of the Columbia; they own two portage railroads, of their own construction, one six and the other fourteen miles long, and their capital is now over two millions of dollars, besides paying large dividends; so that the Company has become, deservedly, a power on this part of the Pacific slope.

To the liberality and kindness of Captain I. H. Ainsworth, President, and Mr. Reed, Treasurer of this important organiza-

tion, our party are under very great obligations for the free use of their steamers, wherever we could avail ourselves of them to facilitate our examinations; on Puget Sound, on the rivers, and on Lake Pend d'Oreille. In no other way could we have made some of our most important observations so satisfactorily, and in the shortest possible time. There is, perhaps, no single fact to which I can refer in connection with our investigations more suggestive of the rapid and substantial growth of trade and commerce on this part of the Pacific coast, than the eminent success of this Steam Navigation Company, and the flourishing condition of Portland, the home of its far-seeing and public spirited proprietor, Captain Ainsworth.

Leaving Portland on one of the Company's admirable steamers, we steamed down the Willamette river a few miles to the Columbia river, and down that noble stream to the mouth of the Cowlitz, and up the Cowlitz a short distance to the town of Monticello, which is sixty miles by water from Portland. Here we disembarked, and were conveyed in coaches, partly along the valley of the Cowlitz, and thence over the portage between the waters of the Columbia and those of Puget Sound, to *Olympia*, a flourishing town at the very head of Puget Sound, a distance of eighty-five miles from the mouth of the Cowlitz river, and one hundred and forty-five, by our travelled route from Portland. The country between the mouth of the Cowlitz and Olympia, on the stage route, is very hilly, part of the way, but the valleys on either side of the portage mentioned, present a remarkably favorable route for a railroad with easy grades between the valley of the Columbia and Puget sound.

At Olympia, Captain Ainsworth, who kindly accompanied us, placed another steamer at the command of our party, and with her we made the tour of the Sound, stopping at the principal ports and noting all objects of interest. The citizens of Olympia take a warm interest in the Railroad, and extended to us numerous courtesies, and gave us much information. Olympia is in latitude $47^{\circ}.03$ north; longitude $122^{\circ}.55$ west. The magnetic variation on this part of the coast is about $20\frac{1}{2}^{\circ}$ east.

From Olympia we coasted along the eastern shore of the Sound, visiting *Tacomah*, about thirty miles from Olympia, in Commencement bay, where a large new saw-mill was just going into operation. It has six steam engines, and two hundred and fifty tons of machinery. There is deep water here, sufficient for the largest vessels. The tide-rise is usually about thirteen feet, but sometimes it is sixteen feet or more.

Tacomah is situated at the mouth of the Puyallup river. An Indian Agency is still kept up on the left bank, near the mouth of the river. It may be stated here that, with the exception of Olympia, all the ports on the Sound have at their piers an abundant depth of water for the largest sea-going vessels. Olympia harbor, at its upper end, is only navigable for large vessels when the tide is in; the shoal water extending about a mile and a-half from the piers. In approaching Seattle we passed Point Alki, and about two miles farther, just before entering the bay Lamb's Head. The Freeport Mills are just around the point of Lamb's Head, and the Territorial University of Washington Territory stands on an eminence to the left of the town. The citizens fired a salute in honor of our arrival, and expressed the liveliest interest in behalf of the Railroad; hoping that Seattle would be selected as one of its terminal points. The land rises rather abruptly immediately back of the town, to the height of about three hundred feet above the sea, and then gradually falls and rises in heavy undulations, till at three miles back it falls to the level of Lake *Washington*, a fresh water lake, which is said to be only about twenty feet above high tide. The lake is between twenty and twenty-five miles long, and about eight miles wide. It has a large island near the middle. At the northern end of Lake Washington there is an outlet to a smaller one, called Lake *Union*, which is said to be about seven feet above high tide. Lake Union has an outlet to the Sound, near Seattle. There is also an outlet from the southern end of Lake Washington, by which the water flows into the Duwamish river, which runs to the Sound south of Seattle. The water of Lake Washington is perfectly clear and pure, and it is quite

deep. There are here combined, water and water power for supplying a city. We rode over to the lake, and went in a boat obliquely across to its eastern side, about nine miles, and walked two and a-half miles over undulating ground to examine a coal mine, which had been opened but a short time. We found a regular vein of bituminous coal, of four to five feet thickness—a very fair article of coal for blacksmith and other purposes. Afterward, in an interview with Mr. L. B. Anderson, the pioneer of coal discovery along the Sound, I learned that he had traced this vein and others for six miles east and west, and that the lowest and best vein was sixteen feet thick—next to the basaltic rock. At Seattle the heaviest ships load with lumber for foreign ports. In going out to the north from Seattle bay, we pass West Point. At the head of the bay of Seattle is the Duwamish river.

From Seattle we steamed over to *Port Gamble* or *Tee Ka Let*, where we found important saw-mills, belonging to Pope and Talbot—the largest now on the Sound. These mills have made one hundred and fifty thousand feet board measure in twenty-four hours. When their new gang saws, now nearly finished, are complete, their capacity will be two hundred thousand feet per day. This firm owns and sails seventeen vessels to San Francisco, the Sandwich Islands, etc. They have had eight vessels at a time loading lumber at their wharves. They employ a steam-tug for towing large rafts. I present these statistics, in order to convey an idea of the magnitude and importance of the lumber business of Puget Sound. Without describing each locality where there are saw-mills, may state that there are ten establishments now running, whose average daily product is from five hundred to seven hundred thousand feet, and the number and capacity of the mills is on the increase, and the business is yet in its infancy.

From Port Gamble we went around to *Port Ludlow*, which is also on the west side of the Sound, or rather of Admiralty Inlet, in about latitude $47^{\circ} 54''$. On entering the bay we passed around Port Tala. Here is found another extensive saw-

mill, at Ludlow's Landing, cutting sixty-five thousand feet per day. There were two ships loading there at the time of our visit. Thence we went on to *Port Townshend*. (Point Hudson is in latitude $48^{\circ} 0'' 03''$.) This is a beautiful and perfectly protected harbor, and the town, built partly on the hill and partly under the hill, presents a very pleasing aspect. The island opposite the town across the bay is famous for abundance of deer. Port Townshend is now the first United States port of entry after leaving the British Possessions, or on entering by the Strait of Juan de Fuca from any foreign port.

From Port Townshend we steamed obliquely across in a direction a little north of east to Bellingham bay, on the eastern side of the Sound. Bellingham bay is three miles wide and fourteen miles long, extending from latitude $48^{\circ} 33'$ to latitude $48^{\circ} 48'$, with a depth of water ranging from three to twenty fathoms, with good sticky bottom for anchorage. Bituminous coal mines have been worked at *Sehome* and *Whatcom*, on this bay, for a number of years, and, recently, some new mines have been opened. There is no doubt that coal exists over an extensive area of country east of Puget sound; and as the demand on the coast is steadily increasing, it will be developed to meet the wants of commerce.

In passing the upper part of the Gulf of Georgia we were presented with a charming view of that noble body of water. Indeed, the entire voyage around the Sound, through Admiralty Inlet, the Straits of Juan de Fuca, the Gulf of Georgia, and Bellingham bay, including the views of various prominent points, lovely islands, and distant mountains, was but a passage through a continuous panorama of splendid scenery, which can scarcely be excelled in any part of the globe.

On our return from Bellingham bay, where we were within a few miles of latitude 49° , the extreme northern boundary of the United States, we visited *Victoria*, on Vancouver's Island, a handsome place, situated on a point on a small bay. It was much more flourishing a few years ago, during the Frazier river excitement, than it is now. At present, business is dull, and the

local taxes are very high. Bituminous coal is sold at Victoria for \$4.00 per ton; and anthracite coal is found on Queen Charlotte's Sound, and sold in Victoria.

From Victoria we steered across the Strait de Fuca, obtaining a view of Race Rock Light, also of the remarkable spit projecting six miles into the strait, on which stands the new Dungeness Light House. Thence passing over in sight of Washington Harbor, Protection Island, and back to Port Townshend, where we had to report ourselves as coming from a foreign land. We then returned, touching at the different ports, to Olympia; having made a complete circuit of this remarkable body of water, in which we saw and noted much more than could be conveniently embodied in this preliminary Report. We are under obligations for the great liberality and kindness of Captain Ainsworth, and all the officers of the steamers. It also affords me pleasure to thank Governor Evans, and Captain James S. Lawson, of Olympia, for much valuable information. Captain Lawson, who is in the service of the government, has spent years in the survey and study of these waters. He accompanied us on our trip, and described all important points of interest in a very satisfactory manner. We could not have made an examination of the channels and harbors on these glorious waters under more favorable auspices; and with the additional aid of the coast survey reports and charts, I have been enabled to obtain a very accurate knowledge of this important portion of our Pacific possessions.

I have likewise devoted considerable attention to the reports and charts of the mouth of the Columbia river, and the adjacent coast on both sides. In regard to the Columbia river, at and near its mouth, it may only be necessary to say in this place, in general terms, that it is entirely practicable to construct a Railroad with easy grades and curvature, at moderate cost, from the Willamette river down to any place that might be selected as a commercial terminus on the lower end of the river. Whatever difficulty sailing vessels may experience sometimes in entering the mouth of the Columbia, on account of adverse winds, the San

Francisco steamers experience none in making their regular trips between San Francisco and Portland, passing between the Ocean and the Willamette river, via the Columbia river.

It would consume too much space in this Report to present in detail all the knowledge acquired respecting the waters of Puget Sound, and of the lower Columbia river, in connection with proposed terminating points on the Northern Pacific Railroad. Without at present indicating any particular port as likely to be the best and most advantageous, it may be said that there is a choice of good sites for a large commercial city, such as must soon grow up at the terminal point of the Northern Pacific Railroad on the Pacific coast.

PUGET SOUND.

In referring to Puget Sound, in a general way, the name naturally embraces the entire expanse of waters of which, technically, Puget Sound, the extreme southern portion, constitutes but a small part. The Gulf of Georgia, and the Strait of Juan de Fuca, are the two grand inlets from the Ocean; each being about ten miles wide in their narrowest parts, and generally much wider. The Strait of Juan de Fuca must always be the main commercial avenue from the sea to the extensive region surrounding the vast interior salt water navigation, which permeates that portion of United States territory lying between latitude 47° and 49° , and between longitude 122° and $124\frac{1}{2}^{\circ}$. The coast line of all these inland seas covers a distance of 1,800 miles, surrounded on the eastern side by magnificent forests of pine, fir, cedar, etc., surpassing any forests elsewhere to be found on the globe, in the quantity and quality of the timber. Numerous settlements already exist at different points, generally where saw-mills could be conveniently located, adjacent to the valuable timber tracts, and with their piers so arranged that the largest Ocean ships can lie there in perfect safety, at all times, and receive their cargoes of lumber directly from the mills. The facilities for the greatest lumber trade the world has ever

known, are here; and before the North Pacific Railroad can be completed, the product of the mills around Puget Sound will unquestionably exceed a million of feet per day, or three hundred millions per annum. With the settlements on these shores, which will accompany and follow the construction of this Railroad, and with the interior demand that it will create along the line of the road itself, it is safe to claim that on these inland seas will spring up, almost like magic, a trade which will establish this as the world's chief lumber mart.

There is not anywhere else on the globe to be found an unoccupied field for the establishment and permanent support of a new great city, such as should form the terminus of a Continental Railroad, uniting the waters of the Pacific and Atlantic by the shortest line between the great Puget Sound indentation of the coast in the west, and the Lake Superior indentation of the coast on the east. Between these extreme points the distance by a direct line is only about 1,350 miles; being thirty degrees of longitude of forty-five miles to each degree, between the latitude of 46° and 48° .

Next to the lumber trade in importance will be at first the great fisheries off the Pacific coast; the facilities for the accommodation of which will be found at the terminus of this Railroad, where the vessels will be built, equipped, and found, complete, with every needed appliance, and manned ready for sea. I say "at first," because the day is not far distant when the manufactures which will grow up around this world of waters, will engender a commerce far exceeding that arising from the fisheries; and, as the forests recede under the insatiable demands of an increasing growth of population, agricultural products will fill the apparent void, for it is certain that the soil where these vast forests now grow is remarkably prolific. And if at some period in the future when numerous flourishing cities shall have grown up with the growth of this Pacific coast, the timber should be exhausted, a bountiful Providence has stored up for the use of the coming generations an abundant supply of coal, an article which is the basis of most of the wealth of Great Britain, and

which, more than any single product of the mines, has enabled the United States to take her present stand among the nations.

The climate of this favored region is very remarkable, and will always remain an attractive feature; and which must, therefore, aid greatly in the speedy settlement of this portion of the Pacific coast. Even in the coldest winters there is, practically, no obstruction to navigation from ice; vessels can enter and depart at all times; and the winters are so mild that summer flowers, which in the latitude of Philadelphia on the Atlantic coast, we are obliged to place in the hot-house, are left out in the open garden without being injured. The cause of this mildness is usually, and I think correctly ascribed to the warm water equatorial current, which, impinging against the Pacific coast, north of the Strait de Fuca, passes along nearly parallel with the shore, diffusing its genial warmth over the land, far into the interior. Of the fact there is no doubt, whatever may be the cause.

The opening of the Union Pacific and Central Pacific Railroads, forming part of the continuous railroad communication between the Atlantic and Pacific, is the signal for the commencement of the work which will open, at the earliest practicable moment, the direct line of Railroad by the valley of the Columbia to the Pacific tide water on the river and on Puget Sound. In my opinion this has settled the whole question; for it is only necessary that intelligent men should visit this portion of the Pacific coast to become impressed, as I have been, with its wonderful advantages. Until the opening of that continental line of Railroad, only a few, comparatively, would voluntarily undergo the toil and privations of a laborious journey of five or six months; and few, comparatively, could afford to pay the cost by the ocean and isthmus route; consequently the settlement of the Pacific slope has been slow, in past years, compared with what it will be when cheap fares and quick transportation shall enable hardy and industrious emigrants to pass over on the continental rail. I am not among those who have been so ready to exclaim that the Union Pacific and Central Pacific lines will

prove to be at first comparatively unremunerative. They ought not to be when success is certainly attainable by proper management; the key note of which is, low fares for passengers and freights.

The precise point for the ocean terminus of the North Pacific Railroad cannot well be determined till the final route for the main line shall be adopted; but the foregoing remarks are applicable in any event.

I have dwelt longer than I anticipated upon this end of the route, but the importance of the subject is such that it cannot be satisfactorily disposed of in a few words.

Our party returned from Olympia and passed over to the Cowlitz river, where we embarked in a large canoe managed by Indians, who conveyed us safely down the river, a distance of about thirty miles, affording us an excellent opportunity of seeing the Railroad capabilities of this valley, which are excellent; presenting ground for a good line, with gentle grades, requiring a very moderate amount of work. Near the mouth of the Cowlitz we were met by another steamer belonging to the Oregon Steam Navigation Company, which carried us up the Columbia and Willamette rivers to Portland.

We were already in possession of the reports of Mr. Johnson, Chief Engineer of the Railroad Company, of the surveys made in 1867, of the different passes of the Cascade range of mountains, which intervenes between Puget Sound and the main valley of the Columbia, eastward, and therefore preferred examining on the ground the much more circuitous, though more level, route, via the Cowlitz river Portage, which goes around the mountain range, which is entirely cut through by the Columbia river. It will be observed that this is quite a distinct thing from what is called the Cowlitz Pass, which is by another prong of the Cowlitz river coming from the mountain. The surveys prove the practicability of routes through the passes of the Cascade range, as described in Mr. Johnson's report; and before the final adoption of a route, additional surveys will of course be made, covering carefully all the possible routes between Puget sound and Columbia

river. It is unnecessary in this place to present more detailed views bearing upon the question of these routes. I can state that it is practicable to construct a good railroad between the Sound and the river at a reasonable cost.

On our return to Portland, the gentlemen of that city very kindly gave us all the information they possessed respecting the character of the country along the Columbia and Willamette, and the business of that region, and Captain Ainsworth, President of the O. S. N. Co., again placed at our disposal, free of expense, one of their fine steamers, which plies regularly between Portland and the Cascades on the Columbia river, a distance of sixty miles, which enabled us to have a perfect view of the great valley of the Columbia that far. On our way we touched at Fort Vancouver, a United States post and town of some importance, about five miles above the upper mouth of the Willamette river. At the foot of the Cascades we disembarked and were conveyed in the railroad cars, belonging to the same company, six miles to the head of the falls, where we were placed on board of another excellent steamer belonging to the company. The Cascades present to the tourist a charming scene, though to the engineer they are an obstacle; which has, however, been admirably overcome by the construction of a first-class railroad, which is traversed safely at the rate of twenty-five miles an hour; so that but a few minutes elapse between bidding adieu to one steamer and being comfortably quartered on another ready to proceed up the river, through the most picturesque scenery, fifty miles to the foot of the Dalles, at the City of Dalles, where another railroad, fourteen miles long, conveyed us to the head of the Dalles at Celilo, a small town, where we were accommodated with another of the company's steamers, which took us one hundred and twenty miles to Wallula, a small town at the mouth of the Walla Walla river. On our way we stopped at Umatilla, a town eighty-five miles above Celilo, and discharged thirty-three tons of freight in less than an hour.

At Wallula, we left the river, and proceeded into the interior thirty miles to Walla Walla, in Washington Territory, a town of considerable importance, within a mile of which stands new Fort Walla

Walla. There are many objects of interest to the tourist, such as the Cascades, the Dalles, with its great salmon fisheries, the Bridalveil Falls, Castle Rock, Governor Stevens' Monument, and others which I have not here taken time to describe, although they are prominently known along the Columbia valley, and on Puget Sound, Mount Baker, Mount Adams, and Mount St. Helens, with their elevated snow-clad peaks, are the pride of Washington Territory; whilst Mount Jefferson and Mount Hood, with tips in the eternal snows, constitute grand and conspicuous objects in Oregon, and are visible, especially Mount Hood, at a great distance, from various points along the river. Were I to enter upon descriptions of all the wonders which attracted our attention, volumes would take the place of a report.

Thus, through the aid of the admirable steamers of the O. S. N. Co. we were enabled, in a brief time, to make a most satisfactory reconnoissance of the great valley of the Columbia, to within twelve miles of the junction of the Snake river with the Columbia; which is about three hundred and fifty miles from the ocean, and two hundred from tide-water in the Columbia river. On the greater portion of the way a good Railroad with low grades, can be built at moderate cost. There are some miles of heavy work, but my detail notes show that the miles of easy construction predominate so materially as to reduce the average cost within very moderate limits. One fact is of more value than many theories. The fact that a private company, in the very infancy of the white settlement of this portion of Oregon, constructed first-class Railroads around two of the most difficult points in the valley; one six and the other fourteen miles long, and thereby securing the control of traffic and passenger travel which has paid handsome dividends on the cost, is a practical proof of the feasibility of the route along the river.

Although our steamer stopped at Wallula, there is good steamboat navigation most of the year for more than a hundred miles farther up the Lewis or Snake river, and there are many long stretches of good steamboat navigation on the upper Columbia, and along Clarke's Fork.

The citizens of Walla Walla, and of the flourishing agricultural valley of which it is the business centre, have projected a Railroad to the Columbia river at Wallula; and, as the ground is quite favorable for the construction of a road of light grades, at very moderate cost, it will probably be built very soon. The enterprising farmers of that region will not long be contented with the onerous tax of thirty miles of common road to reach the grand commercial avenue—the Columbia river.

At Walla Walla we fitted out our horseback expedition for the journey across the country to the Rocky mountains, consisting of eight pack mules and ten saddle horses. During our short stay we were entertained by the hospitable people, and greatly interested in noting the abundant evidences of the wonderfully productive power of the valley, which is remarkable. Half a dozen years ago there was nothing here but the bare ground, where there are now elegant farms and gardens, in which almost every description of grains, fruits and flowers are growing in the greatest perfection and profusion. Philip Ritz, Esq., the new Marshal of Washington Territory, who kindly accompanied us during a large portion of our journey, has here a gem in the shape of house and grounds, orchards and gardens, all of which has been formed in less than five years. Mr. A. B. Roberts, an enterprising farmer, took us over his place and showed us agricultural productions, which, in quality, size and quantity, appeared most marvellous. The flower garden of Mr. Dugan, a prominent lawyer, was also perfectly charming, containing a great variety of the most beautiful flowers, which, in this far off land, constitute a pleasing contrast to the wilderness of grass, which, until recently, covered all this region and reigned supreme.

The latitude of Walla is about $46^{\circ} 03'$, longitude $118^{\circ} 12'$. The route from Walla Walla was chosen with a view to command, in the shortest time, the best general view of the country. We had before us the reports of Lewis and Clark, Governor Stevens, Captain Mullan, and others, and were accompanied by Mr. Ritz, a gentleman who has spent many years on the Pacific slope, and who has frequently passed through the mountains

between the Columbia and the Missouri valleys. We therefore kept away from the immediate course of the river, and journeyed across the country on an intermediate route, leaving the Lewis or Snake river to the south, and Clarke's river to the north of us. We traveled at an average rate of about twenty-four miles a day, writing down as we advanced all objects of interest; our course being nearly northeast as far as Pend d'Oreille lake, one hundred and eighty miles from Walla Walla. We crossed a number of streams, the principal of which are the Touchet river, Lewis or Snake river, Palouse r. r., Camass creek, and Spokane river, which is the prolongation of the Cœur d'Alene river after passing through the lake of that name. The general character of all this region may be described as high rolling prairie, everywhere covered abundantly with bunch grass to the summits of the highest hills; treeless, excepting along the margins of the streams. Such is the country all the way to the northern boundary of the United States (latitude 49°), and beyond into the British Possessions, the Columbia river reaching by two of its principal tributaries as high as latitude 53°. The country near our northern boundary was explored by Captain McClellan in 1853. The information derived from these surveys and the surveys of Governor Stevens, and those of Captain Mullan and others farther south, together with our information derived from intelligent gentlemen who have been through this interesting region, added to our personal observations, leave no possible room for doubt; this is an immense grazing area, of the most superior character, interspersed with the valleys of perennial streams, along which are lands which when settled by industrious farmers will be of the most productive character, as we have seen in the case of a number of improvements already made; whilst the climate to the majority of mankind is not only salubrious, but remarkably attractive. In Washington Territory alone, along its eastern side, there are at least twenty thousand square miles, or twelve million eight hundred thousand acres of the finest grazing lands, on which thousands of cattle and sheep will be raised as cheaply as in any other quarter of the globe; and this grass is so nutritious that

the cattle raised upon it cannot be surpassed in their weight and quality. Snow rarely falls to a sufficient depth to interfere seriously with the grazing all through the winter. Such may be taken as the general view upon this important point respecting an area of territory nearly half as large as the State of Pennsylvania.

The Lewis or Snake river valley and the valley of the Spokane, have been referred to in reports of the Company as routes for the Railroad, and before a final location is made they will, doubtless, receive further examination.

Our route was taken across the valleys, and we passed from Washington into Idaho Territory. At Lake Pend d' Oreille, (in Idaho), our animals, etc., were put on board the steamer of the O. S. N. Co. which had been placed at our service by Captain Ainaworth, and were conveyed in three hours along the eastern coast to the inlet of Clarke's river, a distance of thirty miles, where we landed our animals at an Indian village on the right bank at Patrick's Landing. We then proceeded with the steamer to explore the Lake, continuing around its eastern and northern side, and returning by its southern and western coast, in all, about sixty miles, concerning which I have numerous notes in detail. It is about thirty miles from the entrance of Clarke's river to its outlet. Lake Pend d'Orielle is a lovely body of water, perfectly clear and fresh, and profound in its depths, which are yet unfathomed. It is shaped irregularly, in the form of an ear-drop, as the name betokens; each pendant being about thirty miles long, and from three to seven miles wide; covering a total area of about three hundred square miles, or one hundred and ninety-two thousand acres. It abounds in fish, and presents some of the most charming natural scenery, peculiar to itself. A great portion of its eastern shore consists of high, abrupt rocks, broken down here and there by the valleys of small streams entering into the lake. The country on its western and northern sides is more flat, and better adapted to Railroad construction. The most northerly of the routes proposed for the Northern Pacific Railroad, passes down the right bank of Clarke's river to its point

of debouching into this Lake, and around its north shore to the outlet of the same river near its northwestern end. Thus Clarke's river, which is a very large stream, draining an immense area along the western slope of the Rocky Mountains, runs directly through Lake Pend d'Orielle, maintaining it in perennial salubrity. Should the Railroad be built by this route, this lake will become as famous among tourists as the romantic lakes of Switzerland.

Leaving the lake inlet of Clarke's river, our march was pursued up that stream along its right bank, passing, about twenty miles up, the "Cabinet Rocks," to which point the O. S. N. Co's lake-steamer runs during the spring and early summer, carrying packers and their animals with merchandise for Idaho, Utah and Montana Territories, coming from Portland, Oregon, and other places along the Columbia river valley. The present season, 1869, has been very unfavorable, owing to an unusual drought, which has prevailed all over the mining regions and along the entire Pacific slope in the State of Oregon, and in Washington Territory. About four thousand animals and their packs were conveyed this season, but many packers declined availing themselves of the facilities of the steam navigation, taking their trains around the northern end of the Lake by a circuitous trail difficult to pass in wet seasons. We observed many striking and interesting objects on our route along the valley of Clarke's river, but I am warned by the present length of these preliminary observations, and cannot here introduce a description of them. The Cabinet rapids, the zig-zag trails along steep bluffs, fifteen hundred feet above the river, distant views of high peaks, grand forests, splendid prairies, etc., are parts of these. Our course was continued along the right bank of the river as far as the junction of the *Flathead* and *Bitterroot* rivers forming Clarke's river. Both of these are large streams, always containing a great deal of water. Railroad lines have been projected along them, and their valleys have been explored. They are known to present practicable Railroad routes. Soon after leaving the Lake we entered Montana Territory.

It is about one hundred and thirty miles from Lake Pend d'Oreille, along Clarke's river to the Flathead river, upon which distance there is a variety of scenery; some of the grandest and some of the most beautiful to be found anywhere. For a railroad valley, as a whole, it is not merely favorable but attractive. The few points of difficult work along the rocky bluffs, when thrown into the aggregate, will not increase the cost so as to raise it above a moderate sum per mile; while the grades will be very light, and the curvature generally easy. Clarke's river has a flow in low water at least six times greater than the low water flow of the Ohio river, between Pittsburgh and Wheeling, and while its fall is slight, considered with reference to railroad grades, it is so considerable as to afford a great number of water-powers, whose future value must be very great; an average of eleven feet per mile.

Around Lake Pend d'Oreille, and for some miles westward, and all along Clarke's river above the lake, as far as we traversed it, there is a magnificent region of pine, cypress, hemlock, tamarack and cedar timber, many of the trees of prodigious size. I measured one which was thirty-four feet in circumference, and a number that were over twenty-seven feet, and saw hundreds as we passed along that were from twenty to twenty-five feet in circumference, and from two hundred to two hundred and fifty feet high. A number of valleys containing large bodies of this character of timber enter Clarke's river from both sides, and the soil of these valleys is very rich. Clarke's river valley itself is for much of the distance confined by very high hills approaching near to the stream in many places; but there are sufficient sites for cities and farms adjacent to water-powers of the first-class; and not many years can elapse after the opening of a railroad through this valley till it will exhibit a combination of industries and population, analagous to those which now mark the Lehigh, the Schuylkill, the Susquehanna, and the Pomroy region of the Ohio river. Passing along its quiet scenes of to-day, we can see in the near future, the vast change which the enterprise of man will bring. That which was once the work of half a century is now the product of three or four years. Indeed, in a single year

after the route of this Northern Pacific Railroad shall have been determined and the work fairly begun, all this region, now so calm and undisturbed, will be teeming with life instilled into it by hardy pioneers from the Atlantic and from the Pacific.

Passing along the Flathead river for a short distance, we entered the valley of the Jocko river. The same general remarks concerning Clarke's river valley are applicable to the Flathead and Bitterroot valleys. The climate, the valleys, the timber, the soil, the water-powers; all are here, awaiting only the presence of the industrious whiteman to render to mankind the benefits implanted in them by a beneficent Creator.

We passed up the Jocko valley about thirty miles, and thence by a favorable divide over to the waters of the Hellgate river, a very fine stream, the main continuation of the Bitterroot. Our measurement of the flow of the Hellgate (August 10, 1869,) gave 115,000 cubic feet per minute, when the stream was considered to be quite low. The distance by our travelled route from the Flathead ferry to the town of Missoula, on the Hellgate river, is about fifty-six miles. On all of this it is easy to build a railroad at moderate cost; timber and stone being quite convenient; although for a portion of the way it is a nearly level, treeless prairie.

The people of Missoula gave us a warm welcome, and we have to thank them for many kind attentions. Before arriving there we were joined at our camp on the Jocko by Major John Owen, of Fort Owen, who rode sixty miles to meet us, in company with Major Graham, of Deer Lodge City. These gentlemen gave us much useful information concerning the region through which we were passing, and accompanied us to Missoula and Deer Lodge City.

Missoula is a thriving young town near the western base of the Rocky Mountains, containing a grist-mill, saw-mill, two excellent stores, and twenty-five to thirty dwellings, a number of them well built. I visited McWhirk's garden of five acres, where I found ripe tomatoes, water-melons, musk-melons, remarkably fine potatoes, beans, onions, peas, and squashes; also young apple

trees and other fruit trees, and a very fine collection of flowers; and all this had been brought about from the virgin soil in two years, and would this year yield the owner over two thousand dollars gold, the only currency yet known in that part of Montana Territory.

Messrs. McCormick, Warden, Higgins, and other gentlemen of Missoula, did all in their power to aid us in procuring satisfactory information of various kinds.

It was gratifying to find manifested here, and at every point where there were settlements, the most intense interest in the speedy opening of the Northern Pacific Railroad; which they regard, and very properly, as the only means of placing Montana Territory in a proper position among the States of the Union, and of permanently establishing its general prosperity.

We were accompanied from Missoula by Messrs. Worden and Higgins, who remained with us a number of days, aiding us materially in our examinations.

Just after leaving Missoula, by the way of Mullan's military road, we entered what is called "the gate of the mountains," a romantic, picturesque pass, where the Hellgate river cuts through a mountain. We crossed the Blackfoot river five or six miles from the town, on a bridge with four spans of seventy-five feet each. We made the flow, by measurement, then in the Blackfoot, about 48,000 cubic feet per minute—at its lowest stage.

My notes of our route over to Deer Lodge City, eighty-five miles by our route from Missoula, are very full; but I can only take space here to state that our examinations satisfied me that the routes by the way of the Blackfoot, and the Little Blackfoot, and the valley of the Hellgate, to points near their respective passes on the summits of the Rocky Mountains, are quite practicable. These passes will be referred to further on more particularly.

Deer Lodge City is a flourishing young city, situated in a remarkably fine valley, through which flows Deer Lodge Creek, the principal fork of the Hellgate. When we were yet ten miles

off from this place, we were met by a large delegation of the prominent citizens in a number of carriages and on horseback, who were quite enthusiastic in view of the promise of the Railroad, which seemed to them to be foreshadowed by our coming. Whilst in this interesting locality, which is one of the stirring business centres of the gold region, we were the recipients of many attentions, and obtained a great deal of valuable information. I may with propriety refer more particularly to Granville Stuart, Esq., who has made this whole region a study for years, and to Major Blake, Major Graham, and Judge Dance, who accompanied us in our examinations of the Deer Lodge Pass and other places.

The Deer Lodge valley is very wide in places, ten to fifteen miles from the hills on one side to the hills on the other; nearly level, laterally, and everywhere clothed with rich grass, upon which we observed numerous herds of tame cattle and horses feeding. The Deer Lodge creek flows through it in a meandering direction and adds immensely to its value as an agricultural region. Some farms are cultivated, but farming is yet in its infancy, and there are thousands of acres of arable land here and elsewhere in Montana awaiting settlement.

A few miles above Deer Lodge City there is a very remarkable mound, called the "Deer Lodge," from which the valley, the stream, and the city derive their name. It stands a very prominent object in the midst of a wide, flat valley, and has been formed entirely by the accretion from the unceasing flow of hot springs, two of which exist now on the very summit, which rises thirty-three feet above the plain. It is thirty feet in diameter at the top, and a hundred and thirty at the bottom, surrounded by numbers of springs of various degrees of temperature, the hottest of which we found to be 160° , and the coolest of eight that we tried 98° . The material resembles a light iron ore of a very curious formation. It is a very great curiosity.

Considered as a railroad route this valley is remarkably favorable, the rise from Deer Lodge City to the pass or divide between the waters of the Pacific and Atlantic, being quite gentle;

and even on the last few miles, the summit, about five thousand feet above the sea, may be attained without employing a gradient exceeding fifty feet to the mile, with a moderate cut. The whole forty miles from Deer Lodge City to the summit of the Rocky Mountains by this route can be built as cheaply as roads are built through prairie countries generally. A little more work will be required in passing on the east side from this side down Divide creek to Wisdom or Big Hole river; but the line will be highly favorable as an average all the way to the Jefferson Fork of the Missouri river. This favorable Pass comes into connection more particularly with the Yellowstone valley route to the main Missouri valley. A remarkable circumstance connected with this Pass will convey a very clear view of its peculiarly favorable character. Private parties engaged in gold mining, in the gold field which exists abundantly on both sides of the Rocky Mountains, have dug a ditch across this summit which is only eighteen feet deep at the apex of the divide, through which they carry the water of "Divide creek," a tributary of the Missouri, across to the Pacific side, where it is used in gold washing, and the waste water passes into the Pacific ocean. This has been justly termed highway robbery. The route running down the Jefferson Fork, crossing the Madison Fork over to the Gallatin, and up that valley to near the Bozeman Pass, is very favorable, admitting of easy grades and curves at moderate cost. The Bozeman Pass is about five hundred feet lower than the Deer Lodge Pass, or about four thousand five hundred feet above the sea. Some heavy work of grading occurs on both sides.

The Bozeman divide is not so favorable as that at the Deer Lodge summit, from the fact that the ascent to it on either side is less gentle, though, in comparison with other passes of the mountains, it is quite favorable, being practicable without the aid of a tunnel, with no more costly approaches.

The Yellowstone valley, which we saw only for a short distance, in connection with our examination of the Bozeman divide, is known to be advantageous as a route for a great trunk railroad.

between the East and West. The surveys of General Reynolds, made in 1860, established this fact, and quite recently the expedition under General Hancock has confirmed it. General Hancock reports that the Yellowstone valley is favorable for the construction of a Railroad, and that there are large bodies of valuable land there, needing only the Railroad to develop them. From the mouth of the Yellowstone, eastward to Lake Superior, the capabilities of the country are familiar to many, and known to be, as a whole, very favorable for the cheap construction of a Railroad. I am, therefore, inclined to the opinion that the most advantageous line, in certain important respects, will be found to be by the way of the Yellowstone valley, Bozeman's Pass, Gallatin river, to a point convenient for crossing over to the Madison, and across that stream to the Jefferson, up the Jefferson to the Deer Lodge Pass, and down the Hellgate river. Thence westward there is a choice of routes; one passing down Clarke's river and around by Lake Pend d'Oreille, and thence across the great plain to the Columbia, at or near the mouth of Lewis or Snake river; the other an alternate route, down Hellgate to the Bitterroot, along the Bitterroot to its Lou Lou Fork, up that fork to the divide in the Cœur d'Alene range of mountains, and down by the most convenient fork of the Clearwater river to Lewistown, at the junction of the Clearwater with Lewis or Snake river, and thence down Snake river to its mouth, there meeting the line first above described—the Pend d'Oreille line.

This general route (by either of these two lines) may or may not prove to be the shortest on a final location; but it will as a whole be on the route of the least snow; the Deer Lodge Pass of the Rocky Mountains being noted for the comparatively small quantity of snow which falls or lies there. Captain W. W. DeLacy, who has spent many years in surveys in this region for the government, and who was connected with the surveys and reports of Captain Mullan, as well as those of Governor Stevens, stated to me, as his opinion, founded on personal experience and an excellent knowledge of the topography and climate of Montana that the line of easiest grades and least snow passing through

Montana Territory, would be by Bozeman's Pass from the Yellowstone valley, and through the Deer Lodge Pass, substantially as I have described it. The line of "easiest grades and least snow," crossing the Rocky Mountains, can afford to encounter some increase of distance, especially when to that can be added, *least cost per mile for construction.*

Returning from our examination of the Deer Lodge Summit, we passed over to the Little Blackfoot river, down which the line must run in case Mullan's Pass should be chosen for the route over the Rocky Mountains. It may as well be stated here that the Little Blackfoot affords a good route for the road westward after the mountain has been passed, and that the Blackfoot offers a good route for a line from Cadotte's Pass, after the mountain has been overcome from the east. My examination of both of these streams at their sources and at points some miles below, in conjunction with reliable information from Captain De Lacy and others, enable me to offer the above statement; but the difficult portions of these routes are caused by the topography east of the mountain. Tunnels are necessary at both of these passes.

Mullan's Pass, which is about sixty miles northward of the Deer Lodge Pass, is a little over six thousand feet above the sea, or one thousand feet higher than the Deer Lodge Divide. It is approached from the east by the Valley of the Missouri river by one of the branches of the Prickly Pear, a tributary of the Missouri. According to the survey and report of Captain Mullan it would require a tunnel two and a fifth miles long; and from an examination of the place it appears to be naturally adapted to tunneling—the ground falling off abruptly, especially at the eastern approach. Excepting that a tunnel of that length is required, the line of the general route up the Missouri Valley and down the Little Blackfoot on the west side is fairly practicable at comparatively reasonable cost when the mountain portion cost is distributed among the aggregate miles.

After examining the crossing of the mountain at Mullan's Pass, we proceeded to Helena, now the principal business centre

of the Territory of Montana, where we were received with great cordiality and many demonstrations of interest in the fortunes of the Northern Pacific Railroad. The new Governor, Hon. J. M. Ashley, happened to arrive at the same time, and made his reception address to the people the same evening; and in that he took occasion to lay great stress upon the paramount importance of the Northern Pacific Railroad to the people of Montana. We were indebted to many gentlemen for attentions and information received in Helena; S. T. Hauser, Esq., N. Langford, Esq. and many others, gave us much information and much kind attention.

From Helena we went in a coach over a good road along the Missouri river valley, one hundred and fifty miles, taking notes of the country going and returning. We stopped at Fort Shaw, on Sun river, and after a pleasant interview with General De Trobriand, obtained from him the promise of an escort, for the purpose of visiting Cadotte's Pass, at the source of the middle fork of the Dearborn river. We spent a day at Fort Benton, examining the points of interest in that vicinity, which were shown to us by the gentlemen of that place. Among other things we looked at the out crop of a coal mine which had recently been discovered within less than two miles of the place. This has been an unfortunate season for the business men of Fort Benton; the water has been so low in the Upper Missouri river that the steamers could not ascend that high, and were compelled to discharge their cargoes several hundreds of miles below.

Returning to the crossing of the Dearborn river, we found our escort arrived in advance of us. The next morning we started on horseback, up the Dearborn river, guided by Mr. Caldwell, whom we brought from Fort Benton, and Mr. Cooper, who is working a coal mine at this point, on the Dearborn river. We passed across several forks of the Dearborn, and were on some very elevated points, affording us a good view of the topography which was spread, map-like, before us, unencumbered by trees, though covered with some of the richest grass we had seen anywhere during our long journey. In the afternoon we

arrived at Cadotte's Pass. I went down about two miles on the west side to the waters of the Blackfoot, to where I could see the character of its valley, which below here is favorable for a Railroad. This Pass was surveyed under the direction of Governor Stevens, and its general characteristics are known. It is not materially different in its elevation from Mullan's Pass, and like that has abrupt ascents on both sides; but a much longer tunnel is unavoidable. The approach on the eastern side, from its appearance, is much more costly than that from the western side, on account of several heavy ravines, and because the country on the eastern side is 567 feet lower at the proposed tunnel entrance than the western. Captain Mullan, who surveyed this Pass, thus refers to it in his report:

"The tunnel will be 4.19 miles in length, when there will be a cut commencing fifty feet deep, and coming out in the valley of the Blackfoot five-hundred and fifty-eight thousandths of a mile west of the tunnel, [nearly six-tenths of a mile.] The cut and the tunnel have a grade of sixty feet to the mile. The highest point of the road, therefore, will be at the entrance of the cut, an elevation of five thousand one hundred and ninety-five feet above the level of the sea, and eight hundred and forty-nine below the mountain summit. [Summit of ground 6,044 feet.] The entrance of the cut will be two and nine hundred and fifty-eight thousandths miles [2.95 miles] west of the western base of the mountain, which is five hundred and sixty-seven feet higher than the eastern."

Captain Mullan's line approached the eastern end of the tunnel with 60 feet per mile grades. By the use of 80 feet per mile grades the tunnel on his line could be started 200 feet higher, and would be considerably shortened; but it is obvious that this portion of the route would be very costly and difficult.

Captain Mullan also surveyed a route through Lewis' and Clark's Pass. This, as well as the other, was traced from the Missouri, via Sun river, and on the last nineteen miles approaching the tunnel, he reports "very difficult and heavy work."

The tunnel itself is $2\frac{1}{2}$ miles long. The summit level of the tunnel is at a debouche a half mile west of the western base of the mountain, and is 5,698 feet above the sea." "The mountain pass being 6,519 feet above the sea." The difficulties on the Lewis and Clarke Pass route, as surveyed, are so great as to render it almost impracticable in view of the fact that there are other routes more advantageous. We then proceeded from Helena to Bozeman City, where we were well received by the gentlemen of that place, and there met a delegation of gentlemen from Virginia City, who accompanied us over to the Yellowstone. Col. Brackett, who is in command of Fort Ellis, about three miles from Bozeman, kindly furnished us an escort under the command of Lieut. Hamilton, who went with our party over the Bozeman Summit and back.

It will be impossible for me in the space and time contemplated for this preliminary Report to consider thoroughly, and properly discuss in detail, the merits of the several routes proposed for the Road crossing the Rocky Mountains; enough, however, is known to enable me to offer an approximate estimate of the cost, etc., of constructing a Railroad, of about two thousand miles length, between Lake Superior and Puget Sound, by the route of the Missouri river valley part of the way, and by the Yellowstone valley from its mouth, via Bozeman's Pass, as already described.

The country westward from Lake Superior to the Missouri river has been so frequently explored that its characteristics are now well known. They are ably and clearly set forth in the Reports made to you, a few days ago, by Governor Marshall, of Minnesota, and Philip W. Holmes, Esq., which I have studied.

PROBABLE COST OF ROAD.

I present an approximate estimate of the cost of building the Railroad, at present ruling prices for work, from Lake Superior to the head of Puget Sound, a distance of two thousand miles, on

the longer of the proposed routes, as nearly as can be ascertained from former surveys and explorations, and from my own personal observation on a large portion of the line, including all the most difficult parts.

It is proper to preface this estimate with some explanatory remarks. The line upon which the estimate is to be given runs from the head of Lake Superior across the Mississippi, the Red river, and the Dakota river to the Missouri; thence crossing the Missouri into the valley of the Yellowstone, and along that stream to Bozeman's Pass, through the Belt range of mountains; thence down the Gallatin valley, crossing the Madison river, and over to the Jefferson valley, and along that to the Deer Lodge Pass of the Rocky Mountains; and along Clarke's valley to Lake Pend d'Oreille; and from the lake across the Columbia plain to Lewis or Snake river; down that to its junction with the Columbia; along the Columbia river to the Cowlitz river; up the valley of the Cowlitz, and over the portage between the Puget Sound and Cowlitz river, and down to Puget Sound at its southern extremity, whence the road may be carried along either side or both sides of the Sound, as far as may be desired, to any port or ports which shall be selected.

Although I would not feel prepared without having the results of further surveys to pronounce this the best possible route which can be found between Lake Superior and Puget Sound, it certainly presents important advantages, and is known to me to be eminently practicable. Shorter routes may be traced, but probably none which will be cheaper, per mile, or which will offer so good a profile for profitable service as a great main trunk Railroad thoroughfare.

In making this estimate, I assume that the graded road bed, bridges, culverts, etc., are to be such as we find on our first-class roads; and that the track is to be thoroughly constructed, with rails of sixty pounds per lineal yard, put together with the most improved joint-ties, and completely ballasted with gravel or broken stone. On the prairie portions, which constitute more than half of the whole road, the track cannot

be ballasted at the time of laying; experience has proved, however, that new roads over such level plains can be run with entire safety at the usual rates of speed, previous to receiving the final ballast. Sufficient allowance is made in the estimate for the cost of conveying the material for the track; though this item will be much less on this road than might at first appear, on account of the number of points where the line crosses, or runs parallel with, navigable water courses, along which the iron rails, cross-ties, etc., can be cheaply transported. The Northern Pacific Railroad route is in this respect very remarkable. Thus, with the magnificent lake navigation to begin with, there is the Mississippi river, the Red river of the north, the Dakota river, all navigable streams crossed at convenient intervals along the first five hundred miles of the route. Thence along the immediate valley of the navigable waters of the Yellowstone river, four hundred miles, to within twelve miles of Bozeman's Pass, in the Belt range. Thence to the navigable waters of the Flathead river, a distance of only about two hundred and twenty miles, which includes the passage of the Rocky Mountains, no part of the line will be more than ten to fifteen miles away from good timber; and beyond that, along the valley of Clarke's river, it will run through or adjacent to forests in which everything in the shape of wood required on railroads is to be had for the cost of cutting. From Clarke's river to the Pacific Ocean, there is cheap water communication all the way. It is clear, therefore, that these striking and advantageous characteristics of this line, conferred by the water courses, and which are equally applicable to a line by the Missouri river and through the more northerly mountain passes, render it unnecessary to add a large per centage for the extra cost of carrying track materials.

For convenience of reference I have arranged the total length of the line to be estimated into six divisions, which appear to be natural, and put the estimate in tabular form.

APPROXIMATE ESTIMATE.

No of Div.	DESCRIPTION OF DIVISION.	Length, Miles.	Estimated Cost.
1.	Lake Superior to Yellowstone river,	550	\$18,750,000
2.	Along the Yellowstone to Boze- man's Pass,	420	11,760,000
3.	Bozeman's Pass to Hellgate river, Mountain Division,	225	9,000,000
4.	Hellgate river to Pend d'Oreille lake,	205	7,000,000
5.	Pend d'Oreille lake to the mouth of Lewis river,	223	7,500,000
6.	Mouth of Lewis river to Puget Sound—Columbia valley Divi- sion,	377	11,310,000
			\$60,320,000
Add for sidings and additional track,			4,200,000
Contingencies, including superintendence and engineering, 10 per cent.,			5,000,000
Telegraph line and instruments, complete, \$300 per mile,			600,000
			\$70,120,000

BUILDINGS.		ESTIMATED COST.	
134	Wood and water stations,	@ \$8,500	\$469,000
20	Engine-houses and turn-tables,	@ 15,000	300,000
5	Principal engine repair-shops,	@ 100,000	500,000
2	Principal car repair-shops,	@ 75,000	150,000
5	Principal car repair-shops,	@ 40,000	200,000
200	Section, tool, and hand-car houses,	@ 500	100,000
134	Freight and passenger stations,	@ 2,000	268,000
150	Freight platform stations,	@ 500	75,000
10	Principal freight and passenger depots,	@ 25,000	250,000
			\$2,312,000

ROLLING STOCK, ETC.			
120	Locomotive engines, freight and passenger,	@ \$13,000	\$1,560,000
100	Passenger cars, first class,	@ 4,000	400,000
50	Passenger cars, second class,	@ 2,500	125,000
30	Smoker's cars,	@ 3,000	90,000
30	Baggage, mail, and express cars,	@ 2,000	60,000
1500	Box, freight, cattle and platform cars,	@ 800	1,200,000
40	Caboose and wrecking cars,	@ 1,200	48,000
20	Tool cars,	@ 800	16,000
80	Hand cars,	@ 200	16,000
	Tools, snow-ploughs, etc. (per 100 miles),	@ 1,000	100,000
			\$3,615,000

In addition to the foregoing there are various outlays, which will necessarily attach to the work during its progress, not covered in the items given, or included under the usual percentage allowed for contingencies; especially at the principal terminal points on Lake Superior and Puget Sound, and on the Columbia river, and likewise at the crossings of the Mississippi, the Red river, the Dakota river and the Missouri river, to connect the Railroad business conveniently with the transportation to and from these respective streams.

Also on the route on which this estimate is predicated, there would be a branch line, a few miles in length, extending to Portland, Oregon. In case the line should be along the Columbia river at Fort Vancouver, it would be only about five miles across to Portland, but involving two costly bridges, one over the Columbia, the other over the Willamette river.

In order to cover the cost of such a branch and the cost of the necessary extra works above mentioned, it will be proper to add to the general estimate the sum of \$1,200,000 for the branch, and \$800,000 for the extra works referred to; making two millions in all. Nothing has been inserted for "right of way," as the land-grant carries with it all that is needed over nearly every foot of the way; and where land is taken up, the owners will gladly give the Company all they may require, in consideration of the benefit to the remainder.

RECAPITULATION.

Grading, masonry, bridging, track and ballast, . . .	\$60,320,000
Sidings, etc.,	4,200,000
Contingencies, including superintendence and engineering,	5,000,000
Telegraph line,	600,000
Buildings,	2,812,000
Rolling stock,	3,615,000
Branch road,	1,200,000
Extra works, etc.,	800,000
Interest on bonds over receipts during construction, . . .	\$78,047,000
	7,230,000
Total,	\$85,277,000
This gives an average of \$42,638 per mile.	

It is obvious that if this estimate is sufficiently liberal to cover all probable contingencies, that the road can be opened for the beginning of traffic for a less sum than the above total; for it is scarcely presumable that all the works at the terminal points, or the ballasting, would be completed at that time, and it would not be necessary to have all of the buildings or rolling stock until business on the road called for them.

I have purposely made no allowance for the reduced cost which may be brought about by the introduction of Chinese labor. It is well known that a large amount was saved in the construction of the Central Pacific and Union Pacific Railroads by the employment of Chinese. It would be more or less hypothetical to assume on this account an important reduction of the amount of the estimate, and I prefer that yourselves and others should judge of it.

My estimate is materially less than estimates which have previously been submitted to the public. Mr. Johnson, the able Chief Engineer of the Company, who has made this route a study for nearly twenty years, and whose original report, published in 1854 (fifteen years ago), I regard as one of the most masterly engineering productions of the present age, obviously designed that the estimates, based, as they had to be, largely upon hypothetical views, should be ample.

I have personally examined and carefully noted all the more difficult portions of the route, excepting such as there may be along the Yellowstone valley; and in regard to that, the report of General Reynolds, published in 1868, and the very recent report given to yourselves by Major-General Hancock, who made a reconnoissance of the Yellowstone valley during the present year, go to confirm the opinion that my estimate is safe for the four hundred and twenty miles assumed between the mouth of the Yellowstone and Bozeman's Pass; namely, an average of twenty-eight thousand dollars per mile, exclusive of the buildings and rolling stock.

It is not possible to embody in a brief special report the numerous notes of the country made by me during the past sum-

mer, which are the basis of the statements herein offered; nor can the advantages of the general route of this road and its future prospects be more than glanced at without more elaborate remarks. It would be unjust to all parties not to refer more particularly to certain cardinal features which the general route of the Northern Pacific Railroad offers for consideration, both in its relation to the internal trade of an immense area of our country, and as the most convenient line for accommodating the commerce of Asia, and of the islands of the Pacific ocean.

In my opinion an increasing commerce with Asia and with foreign countries in general, with the city or cities at the western end of this Railroad, will have the effect of very rapidly augmenting the population on the Pacific slope, not merely or principally by immigration from Asia, but chiefly by emigration across the continent—the overflow of the redundant population of the Atlantic States and of Europe. The peopling of these vast areas in the Columbia valley, abounding in the elements which will yield a liberal support to millions of inhabitants, will open up an entirely new field for the world's industry, thus adding largely to its general trade and commerce. The time seems to have arrived when, in the order of events long ago designed by an overruling Providence, this glorious valley should be handed over to the ameliorating influences of civilized population. The buffalo has already disappeared, and is no longer found throughout the greater portion of the territory to be commercially accommodated by this line of Railroad; the Indian, whose nature and habits make him dependent largely upon hunting, is gradually receding as the white man's path widens, and his power establishes that dominion which it is vain for the Aborigines to oppose. It is no longer merely the penetration, by toilsome marches, of a few half protected settlers along a slow moving line of progress, the two oceans are now bound together by the line of Railroad already completed, the forerunner of other continental east and west Railroads, which are the only means by which the country can be developed, and by which any intrinsic value can be given to the government lands; each line

of Railroad will take in its own special area, from which the Indian must recede, giving place to the very different industrious elements which belong to a higher order of our race.

The Northern Pacific Railroad route is advantageously situated for the early development of a very extensive area, reaching far into the British Possessions on the north, and presenting a clear field to the south of millions of acres of land adjacent to it, to be made a feeder to this line by means of branch roads.

The valley of the Red river, which runs almost due north into Canada, embracing one of the finest wheat regions in the world, will of itself forever insure to the eastern end of the road a profitable trade; and the construction of a north and south railroad through the Red river valley, connecting the main trunk with the region around Lake Winnipeg, will add largely to the business of the Northern Pacific line. The elaboration of isothermal lines has shown that the northern boundary of the United States, latitude 49°, an imaginary line, instead of being the northern boundary of cultivable lands and habitable climate, runs south of a vast body of very superior arable territory, only needing railroad facilities for its successful development. Extensive settlements are already there, knocking at the door, asking American enterprise to open it and unite their commercial destinies with ours. The age of railroads has sealed the doom of political lines of demarkation, and the progress of events is gradually but surely disseminating on this continent that spirit of self-government, the sure offspring of increasing popular intelligence, which must eventually, and perhaps very soon, remove the frail barriers which now separate the United States and Canada as governments; but whether the two countries shall or shall not speedily unite their political government, it is certain that the people will unite in efforts to develop the region lying along the present boundary on both sides between the two countries, and thus practically remove it. On the other hand, southward of the line of the Northern Pacific Railroad route, it is from three to five hundred miles to the line of the present completed railroad between Omaha and Sacramento. Granting that half of this area may

find its most convenient outlet by that road, there are left of this space about two hundred and fifty thousand square miles, or one hundred and sixty millions of acres, in Minnesota, Dakota, Montana, Wyoming, Idaho, Oregon and Washington; destined at no distant period to contain a population of many millions.

These vast interior regions, without the essential aid of railroads, would remain for very many years in the future, as they have through long ages in the past, entirely valueless as marketable property of our government, but with railroads in operation, affording first-class facilities for the enterprising from all countries, the entire face of the land will quickly be changed from the virgin fields and woods to the civilized improvements of mankind, which alone can confer practical values in the world. Thus, by the completion of railroads, and in no other way, can the Government of our people, which is the property of every citizen, realize any pecuniary benefit from these interior Territories and States. Our people, therefore, cannot err in granting lands, privileges and credit to enterprising capitalists who are willing to employ their money, their time and their talents in the execution of these grand avenues of commerce; for the construction of such a line as this between Lake Superior and the Pacific, will give actual value to a region, on an average, at least thirteen hundred miles long by four hundred miles wide, or three hundred and thirty-two million eight hundred thousand acres, which, without the transportation facilities which this line will afford, would, for the most part, rest undisturbed in its primeval condition, comparatively useless and valueless to the government and to our people.

When the granting of a few millions of acres to a Railroad company, carries with it the immediate enhancement, or rather a real creation of value upon six times that quantity of government lands, the soundness of the policy which dictates the grant is surely beyond question.

There is another point which now assumes importance. In the earlier days of discussion concerning Railroads across the continent, it was a matter of moment how to bring about their

construction without extravagant cost, in any reasonable number of years; but this, like most great questions which arise in the movements of mankind, whilst unceasingly advancing in myriad forms of developement, finds a solution in the accompanying circumstances. Thus in the construction of the Union and Central Pacific Railroads, the *need* led to the *way* of building miles of railroad in a marvellously short time.

This experience will of course be applied to the Northern Pacific Railroad; and with the remarkable natural facilities already mentioned arising from its junction with so many navigable streams, and with Lake Superior at one end and the Pacific Ocean at the other, there is no reason why, instead of occupying half a dozen years it should not be completed in *three*. I can now clearly see how it can certainly be built and opened for use between Lake Superior and Puget Sound in 1873; even allowing the greater part of a year to be devoted to surveys before determining in all cases the precise route; but meanwhile having all the preliminary plans and preparations thoroughly digested and arranged, and some portions begun.

THE LANDS.

In the grant of land of alternate sections on a width of forty miles on each side through the Territories, and twenty miles on each side through the States of Minnesota and Oregon, it is assumed that there may be nearly fifty millions of acres which will become the property of the Company. You are already familiar with the general excellent character of the land in Minnesota and Wisconsin, and from the reports of Governor Stevens, and more recently the report of Governor Marshall and Philip W. Holmes, Esq., who under your auspices made a special examination of the country as far as the Missouri river during the present season, you cannot but feel satisfied that a Railroad between Lake Superior and the Missouri river will, within a brief period after its completion, receive local traffic and travel enough to maintain it. Now this can only arise in consequence of the

settlement and cultivation of the lands along the route; and it is therefore obvious that by a judicious system of land sales, settlers can be induced to occupy this territory at once, taking on favorable terms portions of the Company's lands, thus adding largely to the value of the residue, which can be sold on a gradually rising scale of prices, naturally induced by increase of population and the resulting industries.

I must not either designedly or undesignedly convey an impression that all of this immense body of land is arable, or that it is all adapted to the raising of wheat. There is in the large area embraced in this extensive land-grant a great variety of soil and climate, and through the mountain region there is a considerable portion, which but for its mineral wealth would have little value. There are tracts where, owing to the general absence of sufficient rains and dews, the land cannot be made to yield well without irrigation. On the other hand there are numerous valleys of rich land which will yield abundantly at once, without artificial irrigation; and there are many millions of acres of the finest timber in the world. It is of course a question of time when this region shall be settled and sending forth supporting Railroad business; that time will be regulated wholly by the period when the Railroad shall be put in operation. If the commencement and completion of the road were to be deferred for ten years, the whole country would be very nearly ten years later before it could stand, as it should, with the rest of our American civilized regions.

At present the middle portion along and on both sides of the Rocky Mountains, is wholly dependent on the gold production, which has been very remarkable. Gold exists over a very large area in Montana Territory, also in Idaho, and parts of Utah and Oregon and Washington Territories. Gold has been the prime cause of the movement of the people to that once distant interior, but which the opening of the Railroad to the Pacific has brought comparatively near. Only a few years have elapsed since Montana became the theatre of the gold excitement, yet already a number of farms are established, and the capabilities of

the soil and climate are not now a matter of conjecture, but of actual proof. Wheat, butter, nearly all kinds of vegetables, which, until recently, brought fabulous prices all through the gold region, are now but little higher proportionally than in the old settled parts of the States; and this has been effected wholly by the cultivation of farms in Montana Territory. I have the notes, and could give much more detailed views on this and other important points; but were I to enter upon the subject in that way, it would change entirely the character of this special report, rendering it too voluminous. Yet I desire to convey to others the impression that I have myself received from personal observation respecting the capabilities and the drawbacks appertaining to these lands. The entire range from the Missouri river to the Columbia river at Wallula is a grazing region, for the most part covered with very nutritious bunch-grass, upon which wild animals have fattened for ages, and upon which hereafter immense herds of tame cattle will profitably be raised. As a rule, all over this wide expanse of grass-clothed plains and hills there is an inadequate supply of rain, although the droughts are never sufficient to destroy the bunch-grass pasture; and, as a rule, the soil is excellent, and in many places very rich, needing only irrigation. There are, however, numerous valleys with perennial streams fed from the Rocky Mountains, containing land of the most fertile character, already improved in various places, and yielding abundant harvests. Lands, which if left without Railroad facilities, might be allowed to remain forever as natural pasture, will, when there are chances for shipment of the product by rail, be put under cultivation. It is, therefore, safe to assume that the immense landed property of the Company, as a body, in connection with valuable town sites and water-powers, will ultimately be worth much more than the entire cost of the Railroad. It should be borne in mind that where there are now only prairies, subject to continual burnings, trees will spring up and flourish hereafter when these lands become protected by civilization. The growth of trees on the Pacific slope is very rapid.

SNOW.

There is evidence enough to show that the line of road, on the general route herein described, will, in ordinary winters, be much less encumbered with snow where it crosses the mountains than are the passes at more southerly points, which are much more elevated above the sea. The difference of five to six degrees of latitude is more than compensated by the reduced elevation above the sea level and the climatic effect of the warm ocean currents from the equator, already referred to, ameliorating the seasons from the Pacific to the Rocky Mountains. An examination of the profile of the Union Pacific and Central Pacific lines between Omaha, on the Missouri river, and Sacramento, California, a distance of 1775 miles, shows that there are four main summits; Sherman summit, on the Black hills, about 550 miles from Omaha, 8235 feet above the sea; one on the Rocky Mountains, at Aspen summit, about 935 miles from Omaha, 7463 feet; one at Humboldt mountain, about 1245 miles from Omaha, 6076 feet, and another on the Sierra Nevada, only 105 miles from the western terminus at Sacramento, 7062 feet; whilst from a point west of Cheyenne, 520 miles from Omaha, to Wasatch, 970 miles from Omaha, a continuous length of 450 miles, every portion of the graded road is more than 6000 feet above the sea; being about one thousand feet on this long distance, higher than the highest summit grade on the Northern Pacific Railroad route, whilst for the corresponding distance on the Northern Pacific route, the average elevation is under 3000 feet, or 3000 feet less. The highest summit on the Northern Pacific line is about *three thousand feet* lower than the Sherman summit on the Pacific line.

On the Union Pacific road the profile also shows that for nine hundred continuous miles, from Sidney westward, the road has an average height of over 5000 feet, and the lowest spot on that distance is more than 4000 feet above the sea; whereas on the Northern route only about sixty miles, at most, are as high as 4000 feet; and the corresponding distance of nine hundred miles, extending from the mouth of the Yellowstone to the valley

of Clarke's river, is on average about 3000 feet lower than the Union Pacific line. Then, allowing that 1000 feet of elevation causes a decrease of temperature of three degrees, this would make a difference of nine degrees. There is, therefore, a substantial reason for the circumstance, now well authenticated, that the snows on the Northern route are much less troublesome than they are on the Union Pacific and Central Pacific routes. At the same time it should not be claimed that there will be no trouble from snow on the Northern line. There are places where snow falls to the depth of several feet; and at the higher passes to the north of the estimated line the snows are much deeper than at the Deer Lodge Pass; and also on the alternate line referred to, across the Coeur d'Alene range, the snow falls to a considerable depth. And this is likewise the case on the indicated cut-off routes from the Columbia river, by the way of the Yakima river valley, etc., through the passes of the Cascade range, to Puget Sound. The impression I would wish to create is this: That a line can be so located between the valley of the Missouri and the mouth of the Columbia river, and to Puget Sound, which for the greater portion of the distance will not encounter any serious trouble from snow; and that in the passage of the Belt range, between the Yellowstone and the upper Missouri, in case that that route should be chosen, the crossing of the Rocky Mountains at Deer Lodge Pass, and of the Portage between the Cowlitz river and Puget Sound, no greater obstacles from snow are likely to be met with than have already been encountered and overcome on roads in the New England States and in the State of New York. It is the general impression in the States, an impression entirely natural, that the farther we go to the north the deeper the snow; but on this line the modifying and controlling influences of the mild climate which pervades the Pacific slope and the interior along this latitude, combined with the greatly reduced elevation of the range of country to be occupied, and the low summits of the back-bone mountains to be passed, tend to confirm the favorable statements of intelligent gentlemen who have long been familiar with the regions in question. I cannot hesitate, therefore,

whilst fully appreciating the importance of the matter, to present to you confidently these views in relation to the probable snow difficulties along the proposed route of the Northern Pacific Railroad.

GRADES.

The grades on the route across through the State of Minnesota and Territory of Dakota to the Missouri river will not be materially dissimilar to those on the other finished railroads south of it, passing from Chicago to Sioux City, Council Bluffs, etc.; namely, undulating within the general limit of about forty feet per mile, although it may be deemed advisable, at a few points for short distances, to run to a maximum of one foot per hundred, or fifty-three feet per mile. There is sufficient knowledge of this portion of the route to warrant this assumption. And beyond the Missouri, along the valley of the Yellowstone, to near the Bozeman pass, there is no known reason for assuming any higher limits. In passing Bozeman summit of the Belt range, and in going up the eastern side of the Rocky Mountains, it may be found advisable to adopt a somewhat higher gradient for a few miles in overcoming those summits. This, however, can only be finally determined after careful surveys.

The highest ground encountered between Lake Superior and the Missouri river, at the mouth of the Yellowstone, is only 2300 feet above the sea, the low summit of the Rocky Mountains is but little over 5000 feet, and the Bozeman Pass through the Belt range is assumed to be about 500 feet lower. The height of the country upon which the line is traced, and upon which my estimate of cost is based, may be approximately stated thus, beginning at Lake Superior, going westward:—

	Miles.	Average Height above the Sea.
To Dakota valley,	300	1200 feet.
Yellowstone river,	800	2200 "
Along Yellowstone,	400	2500 "
Flathead valley,	300	3500 "
Lewis or Snake river,	200	3000 "
Puget Sound,	500	400 "
Lake Superior to Puget Sound via Portland,	2000	

Compare this with the profiles of the finished line of the Union and Central Pacific Roads. Properly, the comparison should be made from Chicago—the eastern water terminus of Lake Michigan, of the Omaha line. There are on that route, approximately, as follows:—

From Chicago.	Miles.	Average Height above the Sea.
To Omaha,	500	1000 feet.
Near Cheyenne,	500	3300 "
Cooper's,	100	7300 "
Promontory Point,	485	6200 "
Humboldt,	406	4750 "
Reno,	130	4000 "
Auburn,	118	4400 "
Sacramento,	36	300 "
San Francisco,	100	50 "
Chicago to San Francisco,	2375	

On the Northern Pacific line there need be but two principal summits, whilst on the other there are four; the lowest of which is about a thousand feet higher than the highest on the northern route. If, therefore, the roads were the same length between the Pacific waters and the great lakes and navigable rivers east of the Rocky Mountains, the advantage would be largely in favor of the northern route; but this actual distance is 375 miles less, and the equated distance for ascents and descents in its favor will be very considerable.

The first fairly navigable water for steamers which is met with on the route from Sacramento eastward is the Missouri river at Omaha, 1775 miles; whereas on the Northern line the road will be along or quite near navigable streams a large portion of the distance on the west side of the Rocky Mountains; and soon after crossing them it will strike navigable waters on the eastern side, on the Upper Missouri and on the Yellowstone. The mountain space between the navigable streams on the two sides of the range is only about 250 miles. It is true that the Union Pacific Road runs along near the Platte river, but, owing to its peculiar character, arising from its breadth and sandy shoals, it is not regarded as a practicable steamboat river in its present condition.

The junction of all main trunk railroads that may be built eastward from the Pacific ocean with the Missouri river, will ultimately prove to be much more important than is yet generally imagined; especially when the valley of that great river becomes more densely populated. An extensive interchange of products will take place there, both eastward and westward from the river along the east and west lines. The immense valleys of the Mississippi and Missouri, all the way from New Orleans to the upper waters, are yet in their infancy of population, of agriculture, of manufactures and of general commerce. The construction of railroads along and across these magnificent valleys will stimulate all of these by the great facilities afforded, and throw a large amount of local traffic upon the east and west railroads.

No main trunk line can enjoy a more advantageous position in this respect than the Northern Pacific Road; and to a very considerable extent this will apply in the case of the crossing of the Dakota, the Mississippi, and the Red river; the productions of the Red river, owing to the extent and wonderful fertility of its valley, will at once create a remunerative trade on the eastern end of the Road. This region, it is well known, is admirably adapted to wheat, and intelligent gentlemen who are familiar with its characteristics, have estimated that there are fifty millions of acres of cultivable land in the Red river valley alone, which may be profitably devoted to the raising of wheat and other cereals. Branch lines will undoubtedly be constructed leading from the Northern Pacific trunk along the St. Louis river, the nearest to Lake Superior, as well as along the Mississippi, the Red river, the Dakotah river, and the Milk river branch of the Missouri. These branches will be met by the Canadian improvements, bringing into this connection the extensive regions along Lake Winnipeg, including the valley of the Assiniboine. A branch from the Missouri, reaching to Milk river and up that stream to the great Saskatchewan valley of Canada, will at no distant day constitute a very important feeder of the Northern Pacific line, opening to that large territory railroad outlets to the navigable waters of the Atlantic coast by way of Lake Superior,

and to the Gulf of Mexico by the Missouri and Mississippi rivers. No public project that can be devised can sooner or better develop that vast territory in Canada and bring out its value. The summer isothermal line of 70° reaches to the valley of the Saskatchewan about latitude 51° . The same isothermal passes through Chicago, Cleveland, and Harrisburg in Pennsylvania, on this continent, and through Southern France, Lombardy, and the great wheat growing districts of Southern Russia. These valuable Canadian territories, which for the want of adequate investigation have hitherto been regarded as valueless, are destined within a reasonable period to perform an important part in the progress of agriculture and commerce on this continent. Lines of latitude are no longer the sole guides in estimating the climatic characteristics or producing qualities of regions to the north, since experience has shown that the chilling effect of high latitude so marked on the Atlantic coast is overruled by the influence of the Pacific ocean, and perhaps other causes not yet thoroughly elaborated or understood.

But a few years will be required after the completion of the Northern Pacific trunk line to secure what may be termed local trade and travel sufficient to sustain the road irrespective entirely of any through business. The Territory of Montana, already yielding more than ten millions of value annually, abounding in elements which must induce a large population, will meet the opening of the road with a very valuable contribution, while there cannot be a doubt that accompanying and following the construction of this line hundreds of settlements will rapidly be made in the valleys of the Missouri and Yellowstone on the east, and in the valleys of Clarke's river and Columbia river on the west of the Rocky Mountains. With respect to the local trade and travel on the road along the lower Columbia, and from the Willamette valley, concentrating at the city of Portland, the population and business are already there, only awaiting the opening of this line to make the western end self-sustaining from the start. I speak confidently on this point from personal observation.

An estimate of items of transportation on a road situated as this is, dependent in part, and to a considerable extent on the settlements which will hereafter be made along the route, would of course be largely conjectural; but if experience on hundreds of roads in the United States which have been extended through comparatively unsettled regions is of any value, there can be no doubt of the result on this line. Its cost will be less per mile than the average cost of railroads in this country; and the cost of working it, owing to the predominance of light grades over the greater portion of the route, and the facilities it possesses most of the way in good supplies of water, wood and coal, will fall below the average.

The position across the continent on the shortest practicable railroad distance between the Pacific ocean and the great lakes of the Atlantic side, points to this line as one of vast importance in a national point of view, the value of which to the Government cannot easily be overrated. The facilities it will afford for the rapid and economical distribution of troops, ammunition and stores, for the numerous forts on the waters of the Missouri and the Yellowstone, and along the valleys of Clarke's river, Columbia river, and on Puget Sound, will constitute an invaluable military arm, and will save millions annually to the public treasury. A moderate estimate of the mere money saving to the country will show not less than three per cent. on the entire cost of the road every year, for present military transportation alone, to forts now in existence; and more forts will be needed to hold the Indian tribes in check as the white settlements shall be annually extended over Indian territory—a matter which is inevitable, and as certain as the ultimate extermination or absorption of the Indian race. The opening of this road will forever settle the question of white supremacy over an area of country covering at least four hundred and fifty thousand square miles; sufficient to make ten States the size of Pennsylvania.

The Northern Pacific Railroad will be a favorite and most convenient route for trade and travel across the ocean from Asia and the Sandwich and other islands of the Pacific; transporting

Asiatic products quickly to the gold regions of Montana, and distributing them along the valleys of the Yellowstone, the Missouri, the Dakota, the Red river, the Mississippi, and the Lake region. It is true that the main terminus will be at Lake Superior; but connections with St. Paul and Chicago are certain to be made which will put this line in direct communication with the entire railroad system of the United States and Canada.

The prevailing winds and ocean currents of the Pacific are such that vessels from Asia, etc., destined even as far south as San Francisco, are compelled to make nothing which brings them on the parallel with Puget Sound. This is a very important fact in connection with the Northern Pacific route, inasmuch as it has a permanent practical advantage which a great commercial city located on Puget Sound, or on the Columbia river, will enjoy over any port six or eight hundred miles south along the coast.

I have deferred the presentation in detail of many points, among others the harbor termini on Lake Superior, on the Columbia, and on Puget Sound; although I am possessed of information which will enable me at the proper time to discuss the advantages and disadvantages of the several places proposed.

This special report contains, in brief, the substance of the information obtained during an exploration which occupied the entire months of June, July and August; involving in all over nine thousand miles of travelling, on railroads, in coaches, steamers, wagons, canoes, and on horseback; during which, owing to the remarkable facilities afforded through the aid of the modern conveyances by steam, both on land and water, our party was enabled to explore an extent of territory which in the time of Lewis and Clarke occupied nearly two years.

In conclusion, I would state as the result of these explorations and investigations, after much reflection, and fully appreciating the responsibility devolved upon me as the Engineer selected by you for the duty, that the Northern Pacific Railroad route, with the land grant secured to the Company by the Government, possesses great intrinsic value, and will be, as a whole, a remarkably favorable line in all important respects; a line

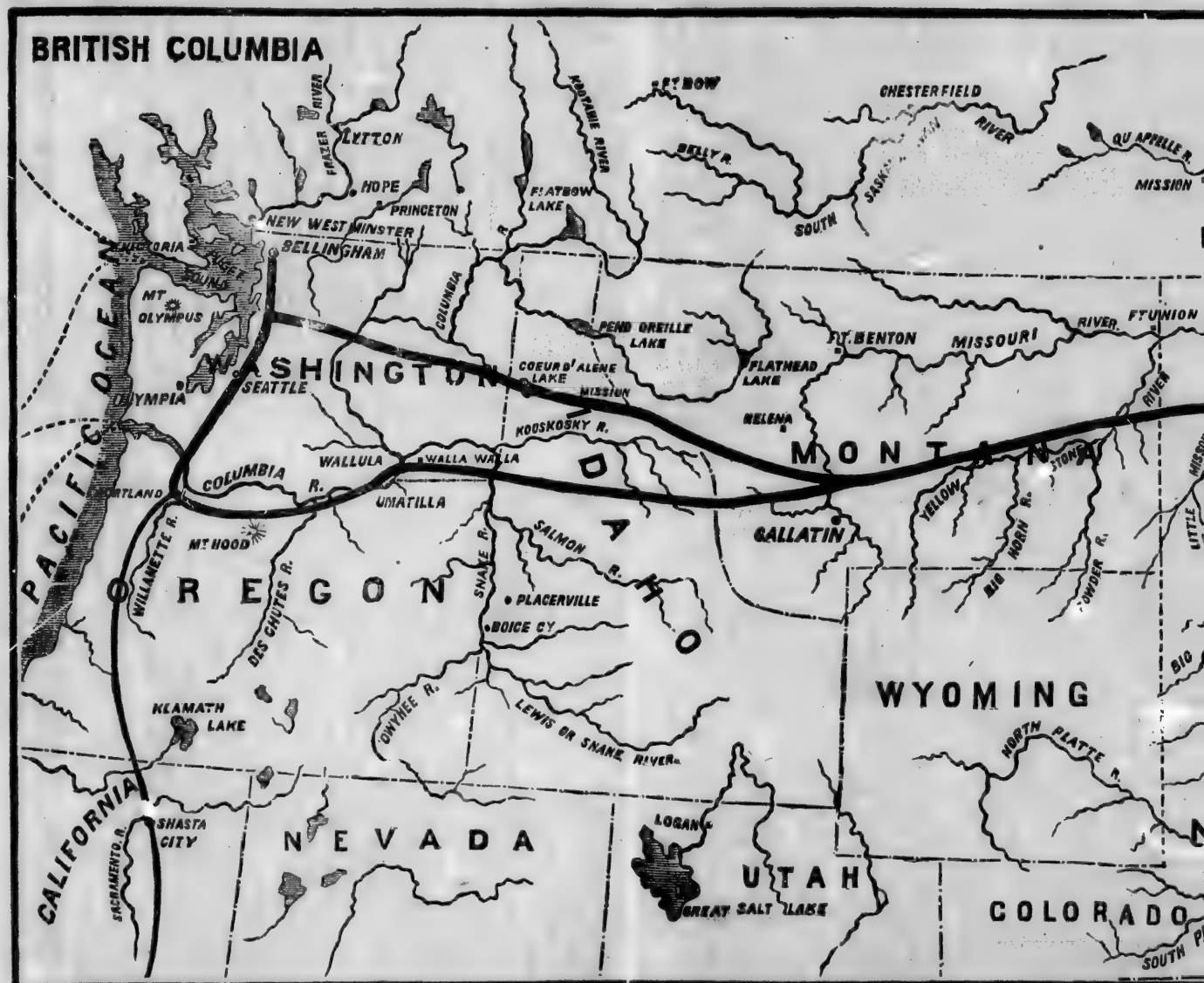
which, if judiciously located, honestly constructed, and properly administered, will pay within a few years a fair dividend on its cost. I had apprehensions that personal investigations might disclose material or possibly vital errors in some of the anticipations induced by former Reports. The result, however, has been in the other direction; and I am constrained by the facts to present an estimate of cost essentially lower than those previously submitted by the able Chief Engineer, and I offer it confidently as reasonable and reliable.

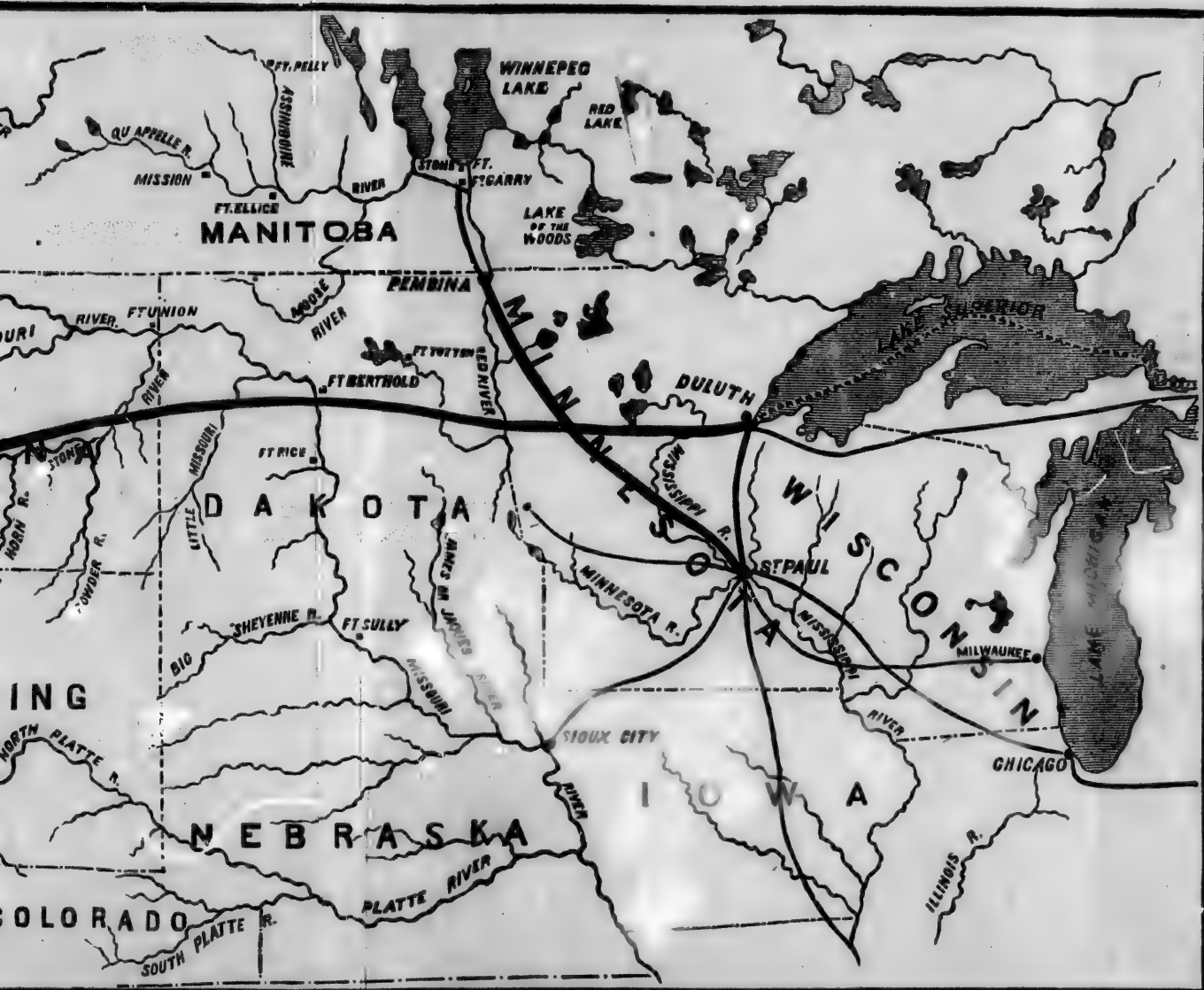
Very respectfully,

W. MILNOR ROBERTS,

U. S. Civil Engineer.

PHILADELPHIA, September 25, 1869.





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THE RATE OF INTEREST is a most convenient as well as profitable one, being seven dollars and thirty cents each year on every hundred dollars, or on the various denominations of bonds as follows:

Two cents per day on each	\$100 bond
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Twenty cents per day on each	\$1,000 "
One dollar per day on each	\$5,000 "
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PERFECT SAFETY.—First Mortgage Railroad Bonds are confessedly among the safest of investments. Of the nearly one thousand railroads of our Northern and Western States, whose total bonded debt exceeds \$650,000,000, it is stated that all but three are regularly paying the interest on their first mortgage bonds, and few investments of equal amount can show so small a default in principal. The author of *Poor's Railroad Manual*, a standard authority, says: "It is undoubtedly true that railroad securities have proved to be the most productive investment for capital that we have had for twenty years."

This being true of all ordinary roads, it is doubly true of those which, like the Northern Pacific, have an immense landed property in addition.

The bonds we are now selling, the amount of which cannot in any case exceed \$50,000 per mile of finished road, are secured by a first and only mortgage on all the property and rights of the Northern Pacific Railroad Company, which will embrace on the completion of the work:

1. Over Two Thousand Miles of Road, with rolling stock, buildings, and all other equipments.

2. Over Twenty-two Thousand Acres of Land to every mile of finished road. This land, agricultural, timbered and mineral, amounting in all to more than Fifty Million Acres, consists of alternate sections, reaching twenty to forty miles on each side of the track, and extending in a broad fertile belt from Wisconsin through the richest portions of Minnesota, Dakota, Montana, Idaho, Oregon and Washington, to Puget Sound.

THE LAND GRANT.—The Northern Pacific Railroad Land Grant is larger than the six New England States with Maryland added, or as large as the two States of Ohio and Indiana combined. The average of soil is very fertile and the climate is pleasant and healthful. With the railroad built through the midst of these lands their value can be estimated by the present price of similar lands along the line of other roads. For example, the Illinois Central Railroad grant of only 2,595,000 acres, the sales from which already exceed \$24,000,000, will yield the Company at least \$30,000,000—an average of over \$11 per acre. As the building of the Northern Pacific Railroad progresses, the lands of the Company will be thrown open to sale and settlement at mode-

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THE MORTGAGE.—For the security of the first mortgage bondholders, and obedient to Act of Congress, the general mortgage covering the property named above is recorded in the office of the Secretary of the Interior at Washington. The Trustees of the mortgage are Messrs. Jay Cooke, of Philadelphia, and J. Edgar Thomson, President of the Pennsylvania Central Railroad Company. These Trustees, who directly represent the bondholders, are required by the terms of the mortgage to see that the proceeds of all sales of First Mortgage Bonds are devoted to the construction and equipment of the road, and that the proceeds of land sales are used in purchasing and cancelling the bonds of the Company if they can be bought before maturity at not more than 10 per cent. premium; otherwise the Trustees are to invest the proceeds of land sales in United States Bonds or Real Estate Mortgages for the further security of Northern Pacific bondholders. At all times until the entire bonded debt of the Railroad Company is paid off and cancelled, the Trustees are required to see that they have in their control, as security, at least 500 acres of average land to every \$1,000 of outstanding first mortgage bonds, besides the railroad itself and all its equipments and franchises.

All bonds issued bear the signature of the President and Treasurer of the Northern Pacific Railroad Company, accompanied by the corporate seal; they are also signed by the Trustees of the mortgage, Jay Cooke and J. Edgar Thomson, and are finally registered and countersigned by the Fidelity Trust and Safe Deposit Company, of Philadelphia.

PROFITABLENESS OF NORTHERN PACIFIC 7-30's.—We are not willing to admit that any investment can be safer than the bonds of the United States, which, as the Government's agents, we placed in the hands of the people of this country and of Europe. But since the Government is no longer a borrower, but is rapidly paying off its existing debt, and as the great work the nation now has in hand is not that of preserving its existence, but that of *developing a continent*, we call the attention of those who desire to increase their income while still having a perfectly reliable investment, to the following facts:

United States 5-20's at their average premium yield the present purchaser less than 5½ per cent. gold interest. Should they be redeemed in five years, and specie payments be resumed, they would really pay only 4¾ per cent., or if in three years, only 3½ per cent., as the present premium would meanwhile be sunk.

Northern Pacific 7-30's, selling at par in currency, yield the investor 7½ per cent. gold interest absolutely for thirty years, *free from United States tax*. \$1,100 currency invested now in United States 5-20's will yield per year in gold, say \$62.00. \$1,100 currency invested now in Northern Pacific 7-30's will yield per year in gold, \$80.30. Here is a difference in *annual income* of nearly *one-third*, besides a difference of 7 to 10 per cent. in principal, when both classes of bonds are redeemed.

With the same entire confidence with which we commended Government bonds to Capitalists and People, we now, after the fullest investigation, recom-

States of Ohio and Indiana combined. The average of soil is very fertile and the climate is pleasant and healthful. With the railroad built through the midst of these lands their value can be estimated by the present price of similar lands along the line of other roads. For example, the Illinois Central Railroad grant of only 2,595,000 acres, the sales from which already exceed \$24,000,000, will yield the Company at least \$30,000,000—an average of over \$11 per acre. As the building of the Northern Pacific Railroad progresses, the lands of the Company will be thrown open to sale and settlement at *moderate prices* and on *easy terms of payment*. As each 25-mile section of the road is completed and accepted, the Government conveys to the Railroad Company a proportionate amount (some 600,000 acres) of land. Thus the Company will soon come into full possession of some three millions of acres in Minnesota—this first installment being greater than the entire Illinois Central grant.

EMIGRATION SCHEME.—To facilitate and render certain the rapid sale and settlement of its lands, and to promote the early development of the entire belt of Northwestern States and Territories tributary to the road, the Northern Pacific Railroad Company is now organizing a Department of Emigration. The system adopted is comprehensive, practical, and on a scale hitherto unattempted by any corporation or government. In connection with this work of fostering emigration from Europe, and the thickly peopled parts of our own country, to the Northwest, will be employed some of our most eminent and trustworthy citizens, both native and foreign-born.

THE ROAD NOW BUILDING.—Work was begun in July last on the eastern portion of the line, and the money provided, by the sale to stockholders of some six millions of the Company's bonds, to build and equip the road from Lake Superior across Minnesota to the Red River of the North—233 miles. The grading on this division is now well advanced, the iron is being rapidly laid; several thousand men are at work on the line, and about the first of August next this important section of the road will be in full operation. In the meantime orders have been sent to the Pacific coast for the commencement of the work on the western end in early Spring, and thereafter the work will be pushed, both eastward and westward, with as much speed as may be consistent with solidity and a wise economy.

FUTURE BUSINESS OF THE ROAD.—The business of the Road, immediately on its completion and even during construction, will be very large, and will consist mainly of: 1. The transportation of Government mails, troops and military supplies. 2. The large local carrying trade of the present population of the States and Territories traversed. 3. The entire trade of the important British settlements occupying the rich valleys of the Red and Saskatchewan Rivers, the Winnipeg Basin, and the fertile plains of British Columbia on the Pacific slope. 4. That portion of the large Through Business between the Atlantic and Pacific Oceans which will certainly pass over this line owing to its great superiority in directness, shortness, and ease of grades. 5. The bulk of the business now done by the numerous steamers plying on the navigable rivers tributary to the Road. 6. The constantly increasing carrying trade of the millions of people who will soon occupy the magnificent country through which the road passes, and the transportation of whose supplies and products alone will speedily constitute a paying business for one line of road.

This Road will unite Lake Superior and St. Paul with Puget Sound—and hence the commerce of the Lakes and of the Mississippi River with that of the Pacific Ocean—by a line, counting actual distance and difference in grades, at least 500 miles shorter than the present one connecting Lake Michigan and San Francisco. By it Liverpool and New York will be brought 1,400 miles nearer than now to the ports of China and Japan. It will be the only trans-continental line under one control.

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MORGAN, KEENE & MARVIN, 2½ W

General Agents for the Sale of the Bonds of the Northern Pacific Ra

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With the same entire confidence with which we commended Government bonds to Capitalists and People, we now, after the fullest investigation, recommend these Northern Pacific Railroad bonds to our friends and the general public.

THEIR PERMANENCE.—Capital invested in these bonds cannot be disturbed for thirty years, unless by consent of the holder. The Government fully expects to call in and cancel its 5-20 bonds within two years. Persons holding the latter and desiring a more permanent investment cannot do better than convert them into Northern Pacific Railroad 7-30's.

THEIR NATIONAL CHARACTER.—The Northern Pacific Railroad is chartered by the Congress of the United States; the present loan and the general mortgage to secure it are authorized by special Act of Congress; the mortgage, as required by law, is recorded in the office of the Secretary of the Interior at Washington; each 25-mile section of the road is to be examined and accepted by Government Commissioners; the right of way across the public domain, and construction material are granted gratuitously by the United States; and finally, while the Government does not directly guarantee the bonds of the Road, it amply provides for their full and prompt payment by an unre-served grant of land, the most valuable ever conferred upon a great national improvement.

BONDS RECEIVABLE FOR LANDS.—By the terms of the mortgage the 7-30 bonds of the Company are always receivable, at par and accrued interest, in payment for the Company's lands at their lowest graded prices; and by an arrangement between the Trustees and the Directors of the Company, in all cash purchases of land from the Railroad 10 per cent. discount will be made from the purchase price whenever the Company's first mortgage bonds are offered in payment. In other words, Northern Pacific 7-30's are, if desired, at all times convertible at 1.10 into real estate at lowest cash prices.

BONDS EXCHANGEABLE.—The registered bonds can be exchanged at any time for coupons, the coupons for registered, and both these can be exchanged for others, payable, principal and interest, at the London and American banking-houses of Jay Cooke & Co., or at any of the principal financial centres of Europe, in the coin of the various European countries. These securities will thus have great currency in the leading money markets of the world.

LIMITED AMOUNT.—The first series of these bonds is now being sold to furnish funds to complete the Northern Pacific Railroad westward to the Great Bend of the Missouri. Should negotiations now pending in Europe result satisfactorily, only a limited amount of these desirable securities will be offered in the American market for some time to come.

HOW TO GET THEM.—Your nearest Bank or Banker will supply these bonds in any desired amount, and of any needed denomination. Persons wishing to exchange stocks or other bonds for these, can do so with any of our agents, who will allow the highest current price for all marketable securities.

Those living in localities remote from banks, may send money, or other bonds, directly to us by express, and we will send back Northern Pacific bonds at our own risk, and without cost to the investor. For further information maps, pamphlets, &c., call on or address any of the Banks or Bankers employed to sell this loan.

RVIN, 2¹/₂ Wall Street, New York,

thern Pacific Railroad Company for NEW YORK, VERMONT,

W JERSEY, and CANADA.

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several thousand men are at work on the line, and about the first of next this important section of the road will be in full operation. In meantime orders have been sent to the Pacific coast for the commencement of work on the western end in early Spring, and thereafter the work will spread, both eastward and westward, with as much speed as may be consistent with solidity and a wise economy.

BUSINESS OF THE ROAD.—The business of the Road, immediately on its completion and even during construction, will be very large, and will consist mainly of: 1. The transportation of Government mails, troops and military supplies. 2. The large local carrying trade of the present population of the States and Territories traversed. 3. The entire trade of the transient British settlements occupying the rich valleys of the Red and Saskatchewan Rivers, the Winnipeg Basin, and the fertile plains of British Columbia on the Pacific slope. 4. That portion of the large Through Business between the Atlantic and Pacific Oceans which will certainly pass over this owing to its great superiority in directness, shortness, and ease of grades. The bulk of the business now done by the numerous steamers plying on the great rivers tributary to the Road. 6. The constantly increasing carrying trade of the millions of people who will soon occupy the magnificent country through which the road passes, and the transportation of whose supplies and products alone will speedily constitute a paying business for one line of road. This Road will unite Lake Superior and St. Paul with Puget Sound—hence the commerce of the Lakes and of the Mississippi River with that of the Pacific Ocean—by a line, counting actual distance and difference in miles, at least 500 miles shorter than the present one connecting Lake Michigan and San Francisco. By it Liverpool and New York will be brought 500 miles nearer than now to the ports of China and Japan. It will be the trans-continental line under one control. Branch lines or feeders will be built from the Trunk road, northward and inward, so as to drain the entire region north of latitude 42° and render the construction of additional east and west lines within that belt unnecessary.

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SECURED BY FIRST MORTGAGE ON RAILROAD AND LAND GRANT.

2. Over Twenty-two Thousand Acres of Land to every mile of finished road. This land, agricultural, timbered and mineral, amounting in all to more than Fifty Million Acres, consists of alternate sections, reaching twenty to forty miles on each side of the track, and extending in a broad fertile belt from Wisconsin through the richest portions of Minnesota, Dakota, Montana, Idaho, Oregon and Washington, to Puget Sound.

THE LAND GRANT.—The Northern Pacific Railroad Land Grant is larger than the six New England States with Maryland added, or as large as the two States of Ohio and Indiana combined. The average of soil is very fertile and the climate is pleasant and healthful. With the railroad built through the midst of these lands their value can be estimated by the present price of similar lands along the line of other roads. For example, the Illinois Central Railroad grant of only 2,595,000 acres, the sales from which already exceed \$24,000,000, will yield the Company at least \$30,000,000—an average of over \$11 per acre. As the building of the Northern Pacific Railroad progresses, the lands of the Company will be thrown open to sale and settlement at *moderate prices* and on *easy terms of payment*. As each 25-mile section of the road is completed and accepted, the Government conveys to the Railroad Company a proportionate amount (some 600,000 acres) of land. Thus the Company will soon come into full possession of some three millions of acres in Minnesota—this first installment being greater than the entire Illinois Central grant.

EMIGRATION SCHEME.—To facilitate and render certain the rapid sale and settlement of its lands, and to promote the early development of the entire belt of Northwestern States and Territories tributary to the road, the Northern Pacific Railroad Company is now organizing a Department of Emigration. The system adopted is comprehensive, practical, and on a scale hitherto unattempted by any corporation or government. In connection with this work of fostering emigration from Europe, and the thickly peopled parts of our own country, to the Northwest, will be employed some of our most eminent and trustworthy citizens, both native and foreign-born.

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United States 5-20's at their average premium yield the present purchaser less than $5\frac{1}{2}$ per cent. gold interest. Should they be redeemed in five years, and specie payments be resumed, they would really pay only $4\frac{3}{4}$ per cent., or if in three years, only $3\frac{1}{2}$ per cent., as the present premium would meanwhile be sunk.

Northern Pacific 7-30's, selling at par in currency, yield the investor $7\frac{3}{8}$ per cent. gold interest absolutely for thirty years, *free from United States tax*. \$1,100 currency invested now in United States 5-20's will yield per year in gold, say \$62.00. \$1,100 currency invested now in Northern Pacific 7-30's will yield per year in gold, \$80.30. Here is a difference in *annual income* of nearly *one-third*, besides a difference of 7 to 10 per cent. in principal, when both classes of bonds are redeemed.

With the same entire confidence with which we commended Government bonds to Capitalists and People, we now, after the fullest investigation, recommend these Northern Pacific Railroad bonds to our friends and the general public.

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SECURED BY FIRST MORTGAGE ON RAILROAD AND LAND GRANT.

BONDS RECEIVABLE FOR LANDS.—By the terms of the mortgage the 7-30 bonds of the Company are always receivable, at par and accrued interest, in payment for the Company's lands at their lowest graded prices; and by an arrangement between the Trustees and the Directors of the Company, in all cash purchases of land from the Railroad 10 per cent. discount will be made from the purchase price whenever the Company's first mortgage bonds are offered in payment. In other words, Northern Pacific 7-30's are, if desired, at all times convertible at 1.10 into real estate at lowest cash prices.

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LIMITED AMOUNT.—The first series of these bonds is now being sold to furnish funds to complete the Northern Pacific Railroad westward to the Great Bend of the Missouri. Should negotiations now pending in Europe result satisfactorily, only a limited amount of these desirable securities will be offered in the American market for some time to come.

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Those living in localities remote from banks, may send money, or other bonds, directly to us by express, and we will send back Northern Pacific bonds at our own risk, and without cost to the investor. Should further information be desired, any of the Banks or Bankers employed to sell this loan, will be glad to answer all questions, furnish pamphlets, maps, &c., and supply the Seventies in small or large amounts.

FOR SALE BY

JAY COOKE & CO.

Fiscal Agents Northern Pacific Railroad Co.

114 SOUTH THIRD STREET, PHILADELPHIA: CORNER OF NASSAU AND WALL STREETS, NEW YORK: 452 FIFTEENTH STREET, WASHINGTON, D. C., BY NATIONAL BANKS, AND BY BROKERS GENERALLY THROUGHOUT THE COUNTRY.

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